4GL

Usage (Appl, user exp)		51
Planning		55
Short ~~Range~~ term (imp)	36	
Longer term	19	
Product evaluation		33
Benefits		13

Info Center

Planning		46
Short-~~range~~ term, i.e., implementation ~~issues~~	29	
Long-term	17	
Criteria for Success, benefits		25
Usage (appl, User experience)		23

Use	5	29	3	20	2	15	10 (22)
Succ	6	35	2	13	0		8 (18)
Imp	3	18	8	53	4	31	16 (36)
P/B	1	16	1	7	6	46	8
[illegible]	1 3	8 18	2	14	7	54	11 (24)
					1	8	3
	17		15		13		45

Info Center

Prod (P)	⑧		21%	④		3		1	
Usage		13	34%		⑤		⑥		②
(U)	6.5			2		2		2	
(S)	3.5			1		2		0	
(A)	4			2		2		0	
Imp		9	24%		③		③		③
(H)	2			0		2		0	
(I)	3			2		0		1	
(D)	4			1		1		2	
Planning		8	21%		②		②		④
B	3			2		1		0	
F	5			0		1		4	
	38			14		14		10	

4 GL

✓ P Prod char

~~Appl/effect on User~~

✓ U User experience

✓ I IC

✓ S Sys Bldg

✓ F Future issues

✓ D Data issues (sharing, control)

✓ B Benefits

~~Imp~~

✓ A Appl / User

✓ H ~~Imp~~ How to Imp

~~S Screen~~

Prod Char

User Exp

Imp
H How to
I Rel to IC
D Data

Plan
B Ben
F Fut

User exp
U User Exp
S Sys Bldg
A Appl

Weighted ~~[illegible]~~ – Info Centers

			2	3	Total
Use exp	5x3 = 15	✓ ①	3x2 = 6	2x1 = 2	23
Success benefits	6x3 = 18	✓ ①	2x3 = 6	1x1 = 1	25
Imp	3x3 = 9	②	8x2 = 16	4x1 = 4	29
P	3x3 = 9	③	2x1 = 2	6x1 = 6	17
					94

Weighted ~~By~~ Imp - 4GL

	①		②		③		Tot
Product	3x8	24	2x4	8	1x1	1	33
Usage	3x13	39	2x5	10	1x2	2	51
Experience	3x6	18	2x2	4	1x2	2	24
Sys Bldg	3x3	9	2x1	2	0	0	11
Applicat	3x4	12	2x2	4	0	0	16
Imp	3x9	27	2x3	6	1x3	3	36
How to	3x2	6	2x0	0	1x0	0	6
Rel to IC	3x3	9	2x2	4	1x1	1	14
Data issues	3x4	12	2x1	2	1x2	2	16
Planning	~~3x8~~	~~24~~	~~2x2~~	4	~~1x4~~	~~4~~	~~32~~
Benefits	3x3	9	2x2	4	1x0	0	13
Futures	3x5	15	2x0	0	1x4	4	19

152

Info Center

U (User exp / how to use) Usage factor

S Success factor

~~Components / definition~~

D/I Def / setting up (Implement) how to imp

Other
~~Adv & Dis~~
~~Justify~~

P Planning (Justify, resource needed) What to imp

B Benefits

RESULTS OF SURVEY OF IC4GL CONFERENCE ATTENDEES

APRIL 21, 1983

PREPARED BY

THOMAS O'FLAHERTY
PRINCIPAL CONSULTANT

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INPUT provides planning information, analysis and, recommendations to managers and executives in the information processing industries (data processing, communications and office systems). Through research, technology forecasting and competitive analysis, INPUT supports client management in making informed decisions. Continuing services are provided to both users and vendors. INPUT's headquarters are in Mountain View, California, with offices in Saddle Brook, New Jersey and London, England.

INPUT

INTRODUCTION

- INPUT, in cooperation with Database Design, Inc. and the University of Michigan Graduate School of Business Administration, circulated a questionnaire to conference attendees who had registered by late March.
    - This questionnaire surveyed attendees on the current status and future plans of their activities in Information Centers and Fourth Generation Languages.
    - The response rate was approximately 25%, which indicates that the survey's results are representative.
    - (Note: Attendees who have not completed a questionnaire are invited to do so; please see a member of the Conference Staff or INPUT representative.)
- This report summarizes the findings of data received by the processing cut-off time. Later returns will have been inspected for any divergent trends. The report covers the following topics:
    - Current usage of Information Centers and Fourth Generation Languages.
    - Expected increases in usage.
    - Fourth Generation Languages usage in production systems.
    - The impact of IC and 4GL.
    - Information Centers vs personal computers and commercial timesharing.
    - Attendees' conference expectations.
- Editorial comments have been kept to a minimum. The purpose of this report is to present a summary of conference attendees' responses to each other and to the speakers.

CURRENT USAGE

- Fewer than half of the respondents now have Information Centers.
    - The length of time that centers have been installed ranges from several months to 12 years. The median period is 1-2 years. Not surprisingly, most of the remaining respondents are planning to implement an Information Center or are giving it serious consideration.
- Over half of respondents are currently using a Fourth Generation Language.
    - A wide variety of languages is being used (see Exhibit 1 for a representative listing).

EXPECTED INCREASE IN USAGE

- Information Center usage is expected to have a very high rate of increase between 1983 and 1985 (see Exhibit 2).
  - End users are expected to increase their use dramatically, with the staff of lower level managers showing the smallest increase, of "only" 400%. It should be kept in mind that these are estimates and, usually, from a low base of current use.
  - While the forecast growth in conventional terminal use for Information Center purposes is quite respectable (over 300%), the growth of intelligent workstations is almost an order of magnitude more. These growth rates also start from a low base in many cases. However, these numbers are consistent with the coming explosion of personal computers foreseen in many organizations.
  - What should be a sobering number is the relatively small growth foreseen in central staff to support this activity. At the very least, extremely good planning will be needed to provide adequate support. Otherwise, the resources devoted to this support will have to be increased.
- The increase in Fourth Generation Language use differs somewhat from increased Information Center use in that programmer use is seen increasing almost as fast as non-programmer use (Exhibit 3).
  - Central staff support is seen to be increasing at a much lower rate than users.
  - This situation has the potential for creating similar problems to those shown in Information Centers discussion above.
- Where IC and 4GL are in use, they are often being used by a wide variety of departments and applications.
  - Almost all companies with firm plans expect both IC and 4GL to be used in virtually all departments by 1985.
  - Information Centers were seen as somewhat less likely to increase revenues.
  - The effects of IC and 4GL on reducing expenses were more mixed, with respondents split between those expecting expenses to decline and those expecting no change (or, in a few cases, an increase).

FOURTH GENERATION LANGUAGE USAGE IN PRODUCTION SYSTEMS

- About one-third of respondents to the survey have had experience in having end users construct Fourth Generation Language-based programs that are used for ongoing production or reporting (i.e., replacing conventional systems development).
  - Their experience has been almost all positive in regard to users constructing their own systems.
  - Some reservations were reported over inefficiencies in 4GL, especially for transaction-based systems.
- About one-third of respondents are using Fourth Generation Languages to construct prototypes which will later be used to design permanent conventional systems.
  - The reaction was quite positive, with few problems experienced.
  - Some firms are using the prototype as the final system as well.
- Virtually all responding companies plan to use Fourth Generation Languages in the future as the basis for at least some production or prototype systems.
  - For most companies not currently using 4GL these plans are still mainly in the discussion stage; however, there are small scale experiments being conducted.
  - The extent of future use is still largely undefined. Small, decision support-oriented systems are far more likely to be candidates for 4GL than large, transaction systems. Exhibit 4 illustrates this in graphical terms.

THE IMPACT OF IC AND 4GL

- Generally, respondents saw Information Centers and Fourth Generation Languages as having a similar impact (current or future) in a particular situation.
  - Many respondents were not able to express an opinion on many of the areas of potential impact posed in the survey.
- The largest positive impact was seen in user satisfaction. Almost as much impact was seen in reducing programmer time, with the 4GL impact being seen as somewhat stronger.
- Information Centers and, to a lesser degree, Fourth Generation Languages were seen as increasing profits and ROI.

- Results and expectations were also mixed in two other critical areas: reducing backlogs and improving system quality.
    - Half the respondents who had views on the backlog issue feared that only inconsequential items would be removed or only the "hidden" backlog would be reduced.
    - Some fears were also expressed that there would be no appreciable effect on quality, in this case because inexperienced personnel might be involved in software development.

INFORMATION CENTERS VS PERSONAL COMPUTERS AND COMMERCIAL TIME SHARING

- In a certain sense, standalone personal computers and commerical timesharing are "competitors" to the Information Center.
    - Respondents were asked whether they saw the Information Center as having an advantage or disadvantage in nine specific areas compared to personal computers and commercial timesharing.
    - Generally, respondents saw the Information Center as having more advantages than disadvantages.
- Personal computers were seen to have a slight edge in user control and response time consistency. However, the Information Center was seen as being better suited in:
    - The related areas of ease of use, software availability and flexibility, and support availability (see Exhibit 5). It should be noted that personal computers are still improving in these areas.
    - A number of respondents saw personal computers having a relative disadvantage as far as ongoing costs were concerned since a larger proportion of Information Center costs were up-front costs.
- Respondents saw no area where commercial timesharing held an advantage.
    - Commercial timesharing was seen to have the most serious disadvantage as far as ongoing cost was concerned.
    - Almost as important were the disadvantages seen in ease of use, user control and support (both needed and available).

RESPONDENTS' EXPECTATIONS ON CONFERENCE COVERAGE OF INFORMATION CENTERS

- Attendees want to know three basic kinds of things about Information Centers:
  - How to plan for them.
  - What the potential benefits and problems are.
  - How IC's are used (user experiences and, to some extent, the applications that are used).
- Planning is twice as important as either of the other two areas (see Exhibit 6).
  - Short term implementation issues are much more important than longer term issues, e.g.
    - Staff and organization
    - How to begin
- Wanting to know about benefits and problems reflects the interests of those who have not fully committed to the Information Center.
- Attendees of all types are interested in the actual usage of an Information Center, particularly other companies' experiences (good and bad).

RESPONDENTS' EXPECTATIONS ON CONFERENCE COVERAGE OF FOURTH GENERATION LANGUAGES

- Planning issues regarding Fourth Generation Languages are also very important for attendees (see Exhibit 7).
  - Besides general "how to" questions, attendees want to know how 4GLs fit into the Information Center and how 4GLs respond to networking and shared function environments (these would also be issues for ICs).
- Benefit/problem issues are of less interest in the 4GL area, possibly because the benefits and problems are more obvious to attendees.
- The usage question is far more important on 4GL issues than on IC issues. Besides general experiences, attendees are interested in specific applications, including experience in using 4GL for system building.
- One area where 4GL needs are quite different from IC needs is the desire to obtain evaluation on the strengths and weaknesses of specific language products.

EXHIBIT 1

FOURTH GENERATION LANGUAGES CITED BY RESPONDENTS

- ADMINSIV
- ADRS
- ANSWER
- APL
- FOCUS*
- IFPS*
- INSYTE
- IPL
- LINC
- NOMAD*
- RAMIS II*
- RELATE
- SAS*
- SIMPLAN
- TELEGRAPH

* = Multiple mentions

EXHIBIT 2

EXPECTED INCREASE IN INFORMATION CENTER (IC) USAGE: 1983 - 1985

USER TYPES	PERCENT INCREASE 1983 - 1985
Programming Staff	280%
Senior Executives	740%
Senior Executives' Staff	1140%
Other Managers	950%
Other Managers' Staff	400%
Clerical	990%
TERMINAL TYPES	
Conventional Terminals Used with IC	354%
. Shared with non-IC Functions	465%
. Dedicated to IC	40%
Intelligent workstations tied to Mainframes	2460%
CENTRAL STAFF SUPPORTING IC	86%

EXHIBIT 3

INCREASE EXPECTED IN FOURTH GENERATION LANGUAGE (4GL) USAGE

	PERCENT INCREASE: 1983-1985
• PEOPLE USING	
– PROGRAMMERS	683%
– NON-PROGRAMMERS	990%
• CENTRAL STAFF SUPPORTING 4GL	124%

EXHIBIT 4

PLANNED USE OF FOURTH GENERATION LANGUAGES

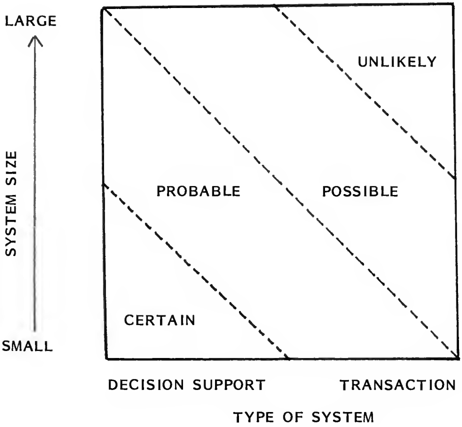


EXHIBIT 5

RELATIVE ADVANTAGES AND DISADVANTAGES OF INFORMATION CENTERS COMPARED TO STANDALONE PERSONAL COMPUTERS AND COMMERCIAL TIMESHARING

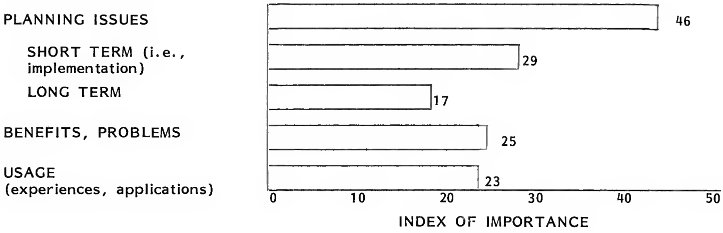
AREA OF COMPARISON	IC COMPARED TO: PERSONAL COMPUTERS	IC COMPARED TO: COMMERCIAL TIMESHARING
• Cost		
– Initial	-0.1	+0.5
– Ongoing	+0.5	+1.6
• Ease of Use	+0.6	+0.9
• User Control	-0.4	+1.1
• Consistency in Response Time	-0.7	+0.3
• Software		
– Availability	+0.7	+0.1
– Flexibility	+0.8	+0.2
• Support		
– Needed	+0.3	+0.9
– Available	+0.9	+0.9

+1.0 = IC Advantage
+2.0 = Strong IC Advantage

-1.0 = IC Disadvantage
-2.0 = Strong IC Disadvantage

EXHIBIT 6

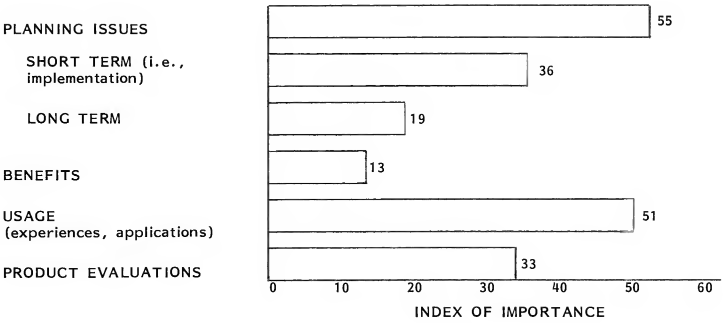
CONFERENCE ATTENDEES INFORMATION REQUIREMENTS: INFORMATION CENTERS (WEIGHTED INDEX)



First priority requirements, weight = 3
Second priority requirements, weight = 2
Third priority requirements, weight = 1

EXHIBIT 7

CONFERENCE ATTENDEES' INFORMATION REQUIREMENTS: FOURTH GENERATION LANGUAGES (WEIGHTED INDEX)



First priority requirements, weight = 3
Second priority requirements, weight = 2
Third priority requirements, weight = 1

The
Research
Department

Kidder, Peabody & Co.
INCORPORATED

October 18, 1977

Automatic Data Processing, Inc.

POINT OF VIEW

Automatic Data Processing is one of the prime investment-grade computer service companies. During the 28 years since its founding in 1949 it has compiled a superb record. Fiscal-1977 revenues totaled $245 million. For the past ten years the least-squares growth rate of reported earnings has been 27.1%; pretax margins have been high and stable at between 17.0% and 20.5% of revenues; net income margins have also been stable at between 8.6% and 10.4%; and growth has been entirely financed internally. The debt to capital ratio is a miniscule 6.5%. The company has a strong positive cash flow, and we expect dividends to increase at a faster rate than earnings. The dividend yield is currently modest at 1.6%.

The company competes in a large computer services market estimated to have amounted to between $4 billion and $5 billion in domestic revenues in 1976 and growing rapidly at an estimated compound rate of 15% to 18%. Despite the size and growth of the market, few computer service companies have compiled stable, successful growth records, and the industry is characterized by a high degree of fragmentation (with an estimated total of more than 2,000 participants) and by a high failure rate (at least in the past decade). These characteristics have been due primarily to the relative ease of entry to the market, the absence of broad quality standards for computer services and software, and an environment in which methods of providing computer service products have been changing rapidly.

Automatic Data Processing is one of the few service companies that offer a large number of specific applications services, many of which may be purchased in batch, remote-batch, on-line, or in-house fashion. These include the following: accounting services such as payroll services to smaller businesses, for which the company has more than 40,000 customers out of its total customer base of 55,000 to 60,000, has an estimated domestic market penetration of 9% to 10%, and is the leading supplier; services to automobile and heavy equipment dealers, of which it is one of the two leading suppliers; and a variety of services to financial institutions (such as brokerages, where the company is the leading supplier) and to corporations, a market being more aggressively penetrated by Automatic Data Processing as a result of its recent thrust into the product areas of on-line data bases and programs. The company's growth pattern appears to be changing from one in which geographic expansion in the United States was the major source of growth to one in which product expansion and geographic expansion abroad as well as in this country are now, and will continue to be, the major sources.

We believe that the major challenge confronting the company is to continue to respond with an increasing number of products to the changing requirements for the provision of computer services to a widely diversified base of customers. The company has proven itself well able to respond to this challenge in the past, particularly in the last two to three years as the types of services offered have proliferated and as expansion abroad has commenced. The internal challenge to management and corporate structure presented by a rapidly growing company in a changing technological area is, in our view, extremely high. We believe Automatic Data has the management stability and depth necessary to accommodate the necessary changes in management and structure. Two other major risks are the potential competition from mainframe and minicomputer equipment manufacturers, particularly as the pricing structure of the computer industry increasingly emphasizes profits from software and computer services rather than hardware, and an expected proportionately lower profit contribution from acquisitions than in the past.

Automatic Data Processing remains a recommendation of the Kidder, Peabody Portfolio Strategy Group.

Company Analysis

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The information contained in this report has been taken from trade and statistical services and other sources which we deem reliable. We do not represent that it is accurate or complete and it should not be relied upon as such. Any opinions expressed herein reflect our judgment at this date and are subject to change.

Additional information on the securities mentioned is available.

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AUTOMATIC DATA PROCESSING, INC.
(NYSE-AUD)

Recent Price(a)	25	Dividend	$0.40
1977 Price Range	31-22	Yield	1.6%
1976 Price Range	36-25		

EARNINGS PER SHARE (b)		PRICE/EARNINGS RATIO	
1979 Estimated	$2.25	On 1978 Estimate	11.1
1978 Estimated	$1.90	On 1977 Estimate	13.2
1977 Actual	$1.58		
1976 Actual	$1.28		

(a) All stock prices in this report are as of October 17, 1977, unless otherwise noted.
(b) Fiscal year-end June 30.

VALUATION

Automatic Data Processing, founded in 1949, is, in our view, one of the most successful of the computer services companies. Initially it offered payroll processing services to small businesses in the New Jersey area. Since the early 1960s, the period in which the services provided were first computerized, it has expanded rapidly into other services and geographical areas.

Growth

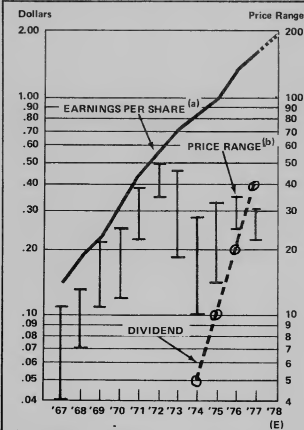
The chart shows the stock-price trend and the earnings-per-share growth since the company's 1967 fiscal year. Earnings per share have grown at a least-squares rate of 27.1%, and we project a longer-term growth rate of 15% to 20%. Table 1, Stock Valuation Data, shows that the price/earnings multiple relative to that of the *S&P 500* ranged from 1.9 in 1967 to 5.3 in 1969.

Dividends

The first dividend of the company was declared in 1974. The dividend yield has remained modest; it is now 1.6% on a 40-cent annual rate. However, we judge that investment of the company's strong cash throw-off (currently approximately $38 million a year) could be more difficult in the future. Acquisitions of the size and type traditionally sought by Automatic Data Processing will become smaller relative to the total company base and may be more difficult to achieve. Consequently, we are anticipating that dividends will rise faster than earnings over the longer term and are projecting a 30% payout ratio, compared with the current rate of 25% based on fiscal-1977 earnings per share.

Risk

A variety of factors contribute to the risk evaluation of the future prospects of the company. Chief among these we would cite the well known problem of adolescence that often afflicts a young, dynamic company as it makes the transition from a



(a) As originally reported.
(b) Calendar year.

Table 1
Automatic Data Processing, Inc.(a)

Stock Valuation Data

					Market-Relative Data		
Year	Earnings Per Share(b)	Dividend	Payout Ratio	Price Range(c)	Company P/E Ratio	S&P 500 P/E Ratio	Company P/E Relative to S&P 500 P/E
1978(E)	$1.90	–	–	–	–	–	–
1977	1.58	$0.28	17.7%	31-22(d)	20-14	10- 8	2.0-1.8(e)
1976	1.26	0.21	16.7	36-25	29-20	11- 9	2.6-2.2
1975	0.99	0.10	10.1	33-14	33-14	12- 9	2.8-1.6
1974	0.82	0.05	6.1	29-10	35-12	11- 7	3.2-1.7
1973	0.70	–	–	47-19	67-27	15-11	4.5-2.5
1972	0.57	–	–	50-36	88-63	19-16	4.6-3.9
1971	0.44	–	–	39-22	89-50	18-16	4.9-3.1
1970	0.33	–	–	25-12	76-36	18-14	4.2-2.6
1969	0.23	–	–	22-11	96-48	18-15	5.3-3.2
1968	0.19	–	–	13- 7	68-37	19-15	3.6-2.5
1967	0.14	–	–	11- 4	79-29	18-15	4.4-1.9

(E) Kidder, Peabody & Co. Incorporated estimates.
(a) Fiscal year-end June 30.
(b) As originally reported and adjusted for stock splits.
(c) Calendar-year.
(d) Year-to-date.
(e) Based on estimate of $11.00 for 1977 earnings for *S&P 500 Index*.

---

highly motivated, entrepreneurial organization (usually with the founders still at the helm) with annual revenues of perhaps $50 million to $150 million to a more structured, less explosively growing company with $300 million to $500 million in revenues. The technology arena is strewn with examples of companies that either failed to make this transition or that faltered in doing so. We believe that one of the principal reasons this transition is so difficult is the significant difference between the management styles and structures needed to successfully run, say, a $50-million-a-year business growing at 30% to 40% annually and those required to manage a $500-million-a-year business growing at 10% to 25%. We also believe that this difference is clearly perceived by Automatic Data Processing management and that steps are being taken to reduce the risk of this transition.

Other major risk factors include the likelihood of a much more modest growth rate for the company in the future as a result of the larger base, the increased difficulty of making suitable geographic and product acquisitions, and, eventually, increased competition between the computer services companies and the computer hardware manufacturers. We believe that most investors have discounted the slower growth rate. However, we do not believe that the hardware-company competition, which may not become a serious problem for perhaps four to eight years, has yet been fully discounted.

Offsets to these negative factors include the following: 1) a broad-based, young, and aggressive management cognizant of the major risks; 2) a reputation for high quality of products and services; 3) a strong position in the industry relative to that of many competitors in terms of coverage, diversity of products, and profitability; 4) participation in several high-growth segments of the services market, particularly in network services and in services for certain specialized industries such as automobile and equipment dealers; and 5) a stable base of revenues from more than 55,000 customers, most of them small and with few other ways of obtaining the data processing services Automatic Data Processing provides.

These significant offsets to the risk factors persuade us to assign the company a below-average risk classification of 2 in the Kidder, Peabody Equity Valuation Model. (In the model there are five risk categories, from 1 through 5, with 3 being "average." Only two of the companies followed by Kidder, Peabody Research—IBM and Procter and Gamble—are assigned to the well-below-average risk [1] group.)

Using a discount rate for the stock market of 12%, and assuming for Automatic Data Processing a long-term earnings growth rate of 15%, a dividend payout ratio of 30%, and a risk classification of 2, the valuation model computes a theoretical price for the stock of 35. With a 13% market discount rate the theoretical price falls to 28. In our view, these

Table 2
Automatic Data Processing, Inc.

Major Computer Services Companies

	1976(a)		Average Growth 1973-76	
	Revenues(b)	Pretax Margin	Revenue	EPS
Computer Sciences	$233	8%	19%	85%(c)
Automatic Data Processing	220	19	24	24
Planning Research	153	5	14	NC
Electronic Data Systems	141	18	7	(4)
Bradford National	66	8	17	23
Tymshare	82	16	28	39
National CSS	41	13	22	26
National Data	34	11	16	15

(NC) Not calculable because of losses in calendar years 1973 and 1974.
( ) Parentheses denote decline.
(a) Calendar-year.
(b) Dollars in millions.
(c) Two-year growth rate because of a loss in 1973.

theoretical prices are somewhat conservative because the earnings growth rate of 15% used in the model is at the lower end of the expected range over the longer term of 15% to 20%.

COMPUTER SERVICES MARKET AND THE POSITION OF AUTOMATIC DATA PROCESSING

The computer services market is exceptionally fragmented. We judge that more than 2,000 domestic companies provide computer services of various types in the United States and abroad and that fewer than a dozen of these companies generate annual revenues in excess of $100 million. Some of the larger companies participating in the market are listed in Table 2 together with their 1976 pretax profitabilities and growth rates of revenues and earnings per share from 1973 through 1976. Automatic Data shows up well in these important characteristics, with pretax profitability of 19%, the highest for the companies shown, with a revenue growth rate of 24% (the second-highest), and with an earnings-per-share growth rate of 24% (third-highest). However, the record of every other company in Table 2 has been blemished in recent years by some form of setback in earnings, and in some cases (for example, that of Computer Sciences) the growth rates of earnings per share are high because they are calculated from low bases following the setbacks.

The Computer Services Market

Worldwide computer services revenues of U.S. companies are estimated to have totaled close to $5 billion in 1976. Table 3 is a breakdown, prepared by International Data Corporation, of the components of this market, with anticipated growth rates through 1981.

Table 3
Automatic Data Processing, Inc.

Industry Breakdown of Market for Computer Services.
(Dollars in millions)

	1976	1981(E)	Compound Growth Rate
Processing Services:			
Batch	$1,860	$ 2,370	5%
Remote batch	565	2,090	30
Interactive	1,160	3,540	25
Subtotal	$3,585	$ 8,000	17%
Facilities Management:			
Federal government	$ 228	$ 385	11%
Custom commercial	30	15	(13)
Industry	237	620	21
Subtotal	$ 495	$ 1,020	16%
Software:			
Packaged software	$ 340	$ 1,140	27%
Contract development	550	880	10
Subtotal	$ 890	$ 2,020	18%
Total Market	$4,970	$11,040	17%

Source: International Data Corporation. (The market data shown are revenues of U.S. companies operating worldwide.)
(E) Estimates of International Data Corporation and Kidder, Peabody & Co. Incorporated.
( ) Parentheses denote decline.

Each of the three major market segments—processing services, facilities management, and software—is projected to grow at an annual rate of 16% to 17% for the five-year period through 1981. However, as is indicated in the table, the components of these segments will show markedly different rates of change varying from a growth rate of 30% a year for remote batch processing services to a decline of 13% a year for custom commercial facilities management services. For the guidance of the reader, the following brief descriptions should help to define the markets analyzed in Table 3.

- *Processing Services*—Services are provided for the processing of customer data, usually on a computer system owned or rented from the manufacturer by the service company. There are three basic types of processing. In *batch* processing the input data and output results are fed to and from the data processing location by nonelectronic means such as mail, hand delivery, or telephone. In *remote batch* processing at least part of the input or output is transmitted electronically via terminals and communication lines, with the lapse of a few minutes or a few hours between input and reception of processed results. In *interactive* processing the electronic communication between terminals and computers is conversational and almost instantaneous.

- *Facilities Management*—The facilities management segment of the market is undergoing structural change. In its original concept facilities management included the complete design, installation, and operation of a data processing system and organization, usually at the customer's premises, to perform a prescribed set of tasks under a long-term contract. Usually such a service firm could utilize the same experience, software, personnel, and other resources for several customers and thereby obtain considerable profit leverage. Additional profit leverage could be obtained from transactional pricing, by which a customer is charged according to the volume of processing performed.

In recent years, however, the profit leverage has been found to be lower than expected. We believe there are two important reasons. The first is the increasing sophistication of customer data processing departments, which often have personnel as adept as those of the facilities management firm. These departments are reluctant to "hand over the store" to a facilities management firm, both because they may become redundant and because they are unwilling to depend upon outsiders for processing services that are vital to their company's operational viability. The second important reason is the relative rarity of data processing services that are common to enough potential customer companies to generate a large, high-profit dollar market for standardized services. The high degree of customization required in most data processing services has reduced the profit leverage of facilities management, in our view.

Consequently, the concept that has become prevalent in the past few years is that of shared services, in which a network of computer systems operated by service companies perform facilities management for customers but in which each computer, instead of being dedicated to the tasks of a single customer at his premises, is shared among several customers and is located at the service-company premises. In our view, this trend in facilities management will make the boundary between processing services and facilities management increasingly difficult to draw.

- *Software*—A service firm can design and sell software in two basic forms. *Packaged* software is used to process on a computer system data for a usually standardized application such as linear programming, data base management, or accounting functions. *Contract development* software is designed by the service firm under contract to perform a given task for a customer. The charge for contract software is often based on manpower hours, a pricing structure that has low potential profit leverage, in our judgment.

Market Position of Automatic Data Processing

Table 4 puts the services offered by Automatic Data Processing into the perspective of the world market. It shows the estimated volumes of Automatic Data revenues in calendar 1976 from batch processing services, a segment in which the company has an estimated 9% of the worldwide market garnered by U.S. companies, and from remote batch and interactive services, segments in which the company has an estimated 3% of the worldwide market. The latter segments are expected to grow much more rapidly (at 27% annually) than the batch segment (whose growth is estimated at 5% annually). Automatic Data Processing aggressively entered the remote and interactive markets relatively recently, by acquiring the Cyphernetics network services operations in 1975, although remote computing services of some kind had been offered by the company as far back as 1968. Revenues from on-line services grew to an estimated $50 million by calendar 1976 and are

Table 4
Automatic Data Processing, Inc.

Share of Major Computer Market Segments
(Dollars in millions)

	Batch Processing	Remote Batch and Interactive	Total
Total 1976 market	$1,860	$1,725	$3,585
Company revenues(E)	$ 170	$ 50	$ 220
Company share	9%	3%	6%
Estimated future market growth rate	5%	27%	17%

(E) Kidder, Peabody & Co. Incorporated estimates of revenues for calendar 1976.

projected to increase 30% to $65 million in calendar 1977.

It is exceedingly difficult to estimate revenues from the individual services offered by Automatic Data Processing and to compare their amounts and growth rates with those of competitors and the markets as a whole for several reasons: the absence of reliable published statistics for market segments, the reluctance of most firms (including Automatic Data) to release such data, and the overlap among the methods of providing some forms of computer services (for example, among the batch, the remote, and the direct on-line methods). Nevertheless, we estimate that the company has attained a leading position in several important sectors.

First, it is the largest independent payroll service company, processing an estimated 3% of individual U.S. payrolls, with estimated fiscal-1977 revenues of $75 million from this source. The closest competitors are probably Statistical Tabulating Corporation, whose annual payroll revenues are estimated to be in the $10-million-to-$15 million range, and the commercial banks that provide payroll services to their clients. However, several bank payroll businesses—for example, those of Citibank, Manufacturers Hanover Trust, and United California Bank—have been acquired by Automatic Data, and the company also has a customer relationship with about 550 banks in the United States. Although 3% of payrolls may not seem to be a large market share, it should be emphasized that the vast majority of individual payrolls are processed in-house by corporations that have their own data processing departments. We believe that the available market for the independent services companies is probably less than 35% of the total number of payrolls and that the remaining 65% will continue to be processed in-house. Therefore Automatic Data's 3% of the total is close to 10% of the estimated available market.

Second, Automatic Data Processing is the leading supplier of computerized brokerage

Table 5
Automatic Data Processing, Inc.(a)

Estimated Revenue Breakdown
(Dollars in millions)

	1976	1977		1978(E)		1979(E)	
	Amount(b)	Amount	Change	Amount	Change	Amount	Change
Commercial Services							
Payroll	$ 61.8	$ 75.0	21.4%	$ 91.0	21.3%	$110.0	20.9%
Other	30.9	40.0	29.5	51.0	27.5	63.0	23.5
Total	$ 92.7	$115.0	24.1%	$142.0	23.5%	$173.0	21.8%
Special Industries							
Financial Services	$ 16.4	$ 19.0	15.9	$ 23.0	21.1	$ 28.0	21.7
Other	48.4	61.5	27.1	74.1	20.5	89.7	21.1
Total	$ 64.8	$ 80.5	24.2%	$ 97.1	20.6%	$117.7	21.2%
Network Services	31.7	41.5	30.9	51.9	25.1	62.6	20.6
Blueprint(c)	10.0	8.5	(15.0)	9.0	5.9	9.7	7.8
Total Revenues	$199.2	$245.5	23.2%	$300.0	22.2%	$363.0	21.0%

( ) Parentheses denote decline.
(a) Fiscal year-end June 30.
(b) Restated for 1977 acquisitions of CPI Group, Inc.; Financial Computer Corporation; and First Data Corporation on pooling-of-interests bases.
(c) Science and Medicine Publishing (which was included in this sector) was sold in May 1976 after contributing $2.8 million to fiscal-1976 revenues.

Table 6
Automatic Data Processing, Inc.(a)

Analysis of Major Components of Commercial Services Revenues(b)

	1972	1973	1974	1975	1976	1977	Growth Rates(c)
Payroll							
Number of accounts	13,000	19,000	25,000	30,000	34,000	40,000	–
Average revenues per account per year	$2,000	$1,900	$1,900	$1,850	$2,000	$2,000	–
Annualized revenue rate *(dollars in millions)*	$ 26.0	$ 36.1	$ 47.5	$ 55.5	$ 68.0	$ 80.0	24.5%
Accounts receivable							
Number of accounts	1,400	2,100	2,600	2,900	3,000	3,800	–
Average revenues per account per year	$3,800	$3,500	$3,600	$3,700	$4,000	$4,000	–
Annualized revenue rate *(dollars in millions)*	$ 5.3	$ 7.4	$ 9.4	$ 10.7	$ 12.0	$ 15.2	21.6
Accounts payable							
Number of accounts	30	350	600	800	1,000	1,500	–
Average revenues per account per year	$2,500	$2,600	$2,800	$3,100	$3,000	$3,000	–
Annualized revenue rate *(dollars in millions)*	$ 0.1	$ 0.9	$ 1.7	$ 2.5	$ 3.0	$ 4.5	93.1
General ledger/financial reporting							
Number of accounts	1,500	2,500	2,800	3,900	4,500	5,600	–
Average revenues per account per year	$1,400	$1,400	$1,400	$1,400	$1,500	$1,500	–
Annualized revenue rate *(dollars in millions)*	$ 2.1	$ 3.5	$ 3.9	$ 5.5	$ 6.8	$ 8.4	30.3

(a) Fiscal year-end June 30.
(b) All data in this table are estimates. The number of accounts and average revenues per account per year are estimated at the end of each fiscal year; the annualized revenue rate is the product of the number of accounts and the average revenues per account per year. No restatement of prior years has been made for acquisitions.
(c) Least-squares 1972-77.

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services to the securities industry. It provides services for more than 1.5 million brokerage accounts of more than 200 customers, including approximately 50 Wall Street brokerage firms.

Third, accounting services for franchised vehicle and equipment dealers contributed an estimated $35 million to fiscal-1977 company revenues. In this field Automatic Data Processing business is believed to be slightly less than that of the industry leader, Reynolds & Reynolds, but more than twice that of the third-largest competitor, Cars, Inc.

The major services offered by Automatic Data (see Table 5 for revenue estimates) can be summarized as follows:

Commercial Services—Batch processing services provided to more than 40,000 customers through 35 data centers contribute just under 50% of company revenues. Most of the customers are small. We estimate (see Table 5) that about 65% of Commercial Services revenues is derived from payroll services and the remainder from other accounting functions such as accounts receivable, accounts payable, general ledger, and financial reporting. Table 6 is an analysis of the growth in these services during the past six years. The least-squares rates of revenue growth have varied from 21.6% for accounts receivable to 93.1% for accounts payable.

Business Systems, a recently instituted service, provides a range of business services, fully backed by applications software and other support services, through terminals connected to Automatic Data regional minicomputers or through on-site minicomputer systems designed to meet specific application needs. Business Systems currently has approximately 50 customers, of which only a few have on-site minicomputers. Revenues from Business Systems are estimated to have been less than $300,000 in fiscal 1977.

Special Industries—Specialized industry and accounting services are provided to automobile and heavy equipment dealers (Dealer Services), wine and spirit distributors (Autonet), nursing homes, real estate managers, brokerage firms, and other specialized industry groups. Most of these services are batch-oriented, but on-line services are also provided that are especially significant to customers engaged in the distribution of wines and spirits and in brokerage. Special Industries contributes an estimated 33% of Automatic Data revenues; the two largest components, we estimate, are Dealer Services, with estimated fiscal-1977 revenues of $35 million (14% of total company revenues), and Financial Services (services for brokerage firms), with revenues estimated at $19 million in 1977 (8% of the company total). In an activity that preceded but is analogous to the Business Systems services of Commercial Services, both on-line and in-house services (with installation of equipment at customer sites) have been offered to Dealer Services customers since 1975. The remote on-line services are provided through terminals attached to a regional network of minicomputers; Automatic Data provides software and maintenance for the in-house minicomputer systems.

Network Services—Constituting approximately 17% of 1977 revenues and the fastest-growing sector of Automatic Data business, Network Services provides general time-sharing and on-line management-oriented information handling and applications programs to nearly 2,000 customers. This sector of the company's business has developed around the operations of Cyphernetics, which was acquired in 1975. Important additions to these operations were made in 1976 by the acquisition of Time Sharing Limited (TSL) with headquarters in London, which expanded the European base, and in June 1977 by the acquisition of First Data Corporation, based in Waltham, Massachusetts, which strengthened Northeastern operations. Network Services offers a wide variety of services. Many of them use proprietary data bases, including the financial Compustat data base, containing information on more than 3,500 U.S. companies; the Chase Econometric family of data bases; Bankcall (semiannual financial data on more than 14,000 banks from U.S. Government reports); Site (demographic data from U.S. Census information); MSF, which is a master file of data on 85,000 securities; and MSS, which provides mass spectrometry data for identifying more than 25,000 chemical compounds. Network Services also has proprietary programs such as Oracle (a business planning and control system), IPL (a general purpose language for rapid development of transaction-oriented systems), and Manager (an information management and reporting system). Major competitors are Tymshare, National CSS, Control Data (through the Cybernet system), and Computer Sciences (with the Infonet system).

Blueprint—Diversified graphic arts reproduction services for general commercial use, primarily in New York City, are provided by the Independent Printing Company, Inc., a subsidiary. This sector of Automatic Data business, the only one that is not data processing, contributes an estimated 3% to 4% of revenues. In fiscal 1977, we believe, Blueprint suffered a loss estimated at $200,000, although in the last three quarters of the year it operated at breakeven. In our judgment, this sector is not an important potential source of growth for the company, and we would not be surprised to see it divested if an appropriate buyer could be found.

THE CURRENT OUTLOOK

We believe that the current outlook for Automatic Data Processing over the short to intermediate term (one to two years) is best analyzed by examining the pattern of recent results and exploring whether further revenue and profit leverage can be obtained. Our study of the major sources of small-business customers (the typical customers for this company), and of the threat of potential competition from suppliers of hardware to small business leads us to conclude that the growth of earnings should be approximately 20% in the current fiscal year, a healthy rate although modestly below the 23% of 1977 and 29% of 1976.

Recent Results and Growth Prospects for 1978 and 1979

We are projecting earnings of $1.90 a share, up 20%, for fiscal 1978, with a further gain of 18%, to $2.25, projected for 1979. Our earnings assumptions are detailed in Table 7. Quarterly earnings-per-share estimates are given in Table 8. The company has reported earnings of $1.58 a share for 1977, a year-to-year gain of 23% and slightly under our previous estimate of $1.60 a share.

Our August 30, 1977, *Comment* discussed the 1977 results. We believe fourth-quarter earnings were reduced about 2 cents a share by problems in the stand-alone-minicomputer operations of Dealer Services. During the quarter six stand-alone-minicomputer systems were returned by customers for refunds totaling approximately $600,000. The returns were triggered by Automatic Data problems with the software for the minicomputers, and by slowness of machine repair in some of the installed sites.

Revenues from sales of such stand-alone systems amounted to an estimated $1.0 million to

Table 7
Automatic Data Processing, Inc.(a)

Estimated Revenue and Earnings Breakdown
(Dollars in millions)(b)

	1976(c)			1977			1978(E)			1979(E)		
		Pretax			Pretax			Pretax			Pretax	
	Revenues(c)	Income	Margin	Revenues	Income	Margin	Revenues	Income	Margin	Revenues	Income	Margin
Commercial Services												
Payroll	$61.8	–	–	$ 75.0	–	–	$ 91.0	–	–	$110.0	–	–
Other	30.9	–	–	40.0	–	–	51.0	–	–	63.0	–	–
Total	$92.7	$21.3	23.0%	$115.0	$26.5	23.0%	$142.0	$32.0	22.5%	$173.0	$37.8	21.8%
% gain	NA	NA	–	24.1%	24.4%	–	23.5%	20.8%	–	21.8%	18.1%	–
Special Industries												
Financial Services	$16.4	$ 3.0	18.3%	$ 19.0	$ 3.4	17.9%	$ 23.0	$ 3.9	17.0%	$ 28.0	$ 4.6	16.4%
Other	48.4	6.9	14.3	61.5	8.1	13.2	74.1	9.5	12.8	89.7	12.5	13.9
Total	$64.8	$ 9.9	15.3%	$ 80.5	$11.5	14.3%	$ 97.1	$13.4	13.8%	$117.7	$17.1	14.5%
% gain	NA	NA	–	24.2%	16.2%	–	20.6%	16.5%	–	21.2%	27.6%	–
Network Services	$31.7	$ 6.2	19.6%	$ 41.5	$ 8.2	19.8%	$ 51.9	$10.0	19.3%	$ 62.6	$12.0	19.0%
% gain	NA	NA	–	30.9%	32.3%	–	25.1%	22.0%	–	20.6%	20.0%	–
Blueprint(d)	$10.0	$ (0.4)	–	$ 8.5	$ (0.2)	–	$ 9.0	$ 0.0	–	$ 9.7	$ 0.1	1.0%
% gain	NA	–	–	(15.0)%	–	–	5.9%	–	–	7.8%	–	–
Total	$199.2	$37.0	18.6%	$245.5	$46.0	18.7%	$300.0	$55.4	18.5%	$363.0	$67.0	18.5%
% gain	22.1%	NA	–	23.2%	24.3%	–	22.2%	20.4%	–	21.0%	20.9%	–
Taxes		$18.3			$22.7			$27.4			$33.2	
Tax rate		49.5%			49.3%			49.5%			49.5%	
Net income		$18.7			$23.3			$28.0			$33.8	
Average shares		14.6			14.8			14.9			14.9	
Earnings per share		$1.28			$1.58			$1.88			$2.27	
% gain		29.3%			23.4%			19.0%			20.7%	

NA Not available.
(E) Kidder, Peabody & Co. Incorporated estimates.
( ) Parentheses denote loss or decline.
(a) Fiscal year-end June 30.
(b) Except per-share data.
(c) Includes restatement for 1977 acquisitions of CPI Group, Inc.; Financial Computer Corp.; and First Data Corp. on a pooling-of-interests basis.
(d) Science and Medicine Publishing (which was included in this sector) was sold in May 1976 after contributing $2.8 million to fiscal-1976 revenues.

Table 8
Automatic Data Processing, Inc.(a)

Quarterly Income Statement
(Dollars in thousands) (b)

	1976(c)	1977					1978(E)				
	Year	1st Q(c)	2nd Q(c)	3rd Q(c)	4th Q	Year	1st Q	2nd Q	3rd Q	4th Q	Year
Revenues	$199,244	$56,393	$60,484	$64,056	$64,554	$245,487	$67,000	$72,500	$79,500	$81,000	$300,000
% change	22.1%	NA	NA	NA	16.6%	23.2%	18.8%	19.9%	24.1%	25.5%	22.2%
Pretax income	$36,982	$9,711	$11,498	$12,127	$12,636	$45,972	$11,150	$13,300	$15,000	$15,950	$55,400
Pretax margin	18.6%	17.2%	19.0%	18.9%	19.6%	18.7%	16.6%	18.3%	18.9%	19.6%	18.5%
% change	31.8%	NA	NA	NA	20.6%	24.3	14.8	15.7	23.7	26.2	20.5
Taxes	$18,250	$4,856	$5,750	$6,072	$5,986	$22,664	$5,565	$6,640	$7,485	$7,710	$27,400
Tax rate	49.3%	50.0%	50.0%	50.0%	47.4%	49.3%	49.9%	49.9%	49.9%	48.3%	49.5%
Net income	$18,732	$4,855	$5,748	$6,055	$6,650	$23,308	$5,585	$6,660	$7,515	$8,240	$28,000
% change	31.1%	NA	NA	NA	23.1%	24.4%	15.0%	15.9%	24.1%	23.9%	20.1%
Shares outstanding *(thousands)*	14,616	14,700	14,700	14,700	14,786	14,786	14,800	14,800	14,900	14,900	14,900
Earnings per share	$1.28	$0.33	$0.39	$0.41	$0.45	$1.58	$0.38	$0.45	$0.50	$0.55	$1.88
% change	29.3%	22.2%	25.8%	24.2%	21.6%	23.4%	15.2%	15.4%	22.0%	22.2%	19.0%

NA Not available.
(E) Kidder, Peabody & Co. Incorporated estimates.
(a) Fiscal year-end June 30.
(b) Except per-share data.
(c) Restated for 1977 acquisitions of CPI Group Inc.; Financial Computer Corp.; and First Data Corp. on a pooling-of-interest basis.

$1.2 million in the fourth quarter of fiscal 1976. The refund therefore caused a negative revenue swing of between $1.6 million and $1.8 million, and a negative profit swing estimated at several hundred thousand dollars on a pretax basis.

We consider a recurrence of such stand-alone-minicomputer refunds unlikely. However, we expect year-to-year comparisons in Dealer Services in the first half of fiscal 1978 to be negatively affected by the probable elimination of outright sales revenues of stand-alone systems. Recent corporate results have been aided by excellent performance in Commercial Services and Network Services, which currently are contributing an estimated 75% of pretax profit.

Management recently projected a gain in earnings per share of approximately 15% for fiscal 1978 (a projection considered disappointing by some observers). In our judgment, this statement reflects the fact that earnings comparisons in the first half of the current year will probably be less robust than those of the second half because of the negative revenue and profit trend in Dealer Services as well as the abnormal strength of Network Services operations in the early months of fiscal 1977. Revenues from stand-alone-minicomputer sales in each of the first and second fiscal quarters of 1977 are estimated to have been approximately $1.0 million. Assuming only lease revenues (no outright sales) this year in that sector, we estimate that the year-to-year decline in revenues from these operations in each of the first two quarters of fiscal 1978 will be about $700,000 to $800,000, a decline that will reduce earnings per share by an estimated one cent to two cents.

We therefore expect earnings-per-share gains of approximately 15% in the first half of fiscal 1978 and larger gains of 20% or more in the second half, leading to an estimated earnings-per-share range for the year of $1.85 to $1.90, a gain of between 17% and 20%. Our single-point estimate is $1.90, based on the probable continuance of the exuberant new sales activity that Commercial Services has experienced so far in the current fiscal year. For 1979 we project earnings per share of $2.25, a gain of 18%.

We believe several important forces will sustain intermediate-term growth at about the level of 20%, notwithstanding the statement of management, following the release of 1977 results, that it expects earnings growth of 15% in fiscal 1978. These include the following:

1) An expanded number of salesmen should enhance profit leverage. A recent rapid expansion of the sales force increased its size by about 300 persons, from 725 to more than 1,000, or approximately 40%, during the 15-month period that began March 30, 1976. We believe that the goal for marketing personnel in 1978 is a further expansion of 15% to 20%. In our view, these increases are well justified by what we perceive to be the product wealth of the company.

One of the major possible restraints on exceptionally high growth for the company is the rate at which it can add sufficient salesmen to penetrate the market for the increasingly diversified product range. We believe that management clearly recognizes the important trade-off between the need for growth and the strains that might result if the growth target is set too high. This trade-off becomes even more important in light of salesforce turnover, which is high for the computer services industry as compared with other industries. For example, annual turnover in the Automatic Data sales force was as high as 35% for some years in the past. In 1978 it is expected to decline to 25%. A further possible constraint is the fact that it usually takes the company at least six months to decide whether a new salesman will be sufficiently productive. Although that learning period has recently been shortened it is still long enough to significantly defer productivity of salesmen.

Nevertheless, these negative considerations are offset by the rapid increase in the productivity of salesmen. About two years ago achievement of $200,000 in gross revenue was an excellent performance for a Commercial Services salesman; in 1977 approximately 8% of the sales force grossed $300,000. We therefore expect that the probable continuation of the rapid build-up in the sales force, coupled with the increasing productivity of salesmen, will leverage company profits during the next two years.

2) Automatic Data Processing is one of the few service companies that can offer data processing to the customer in a variety of ways. Batch, remote batch, and immediate response processing methods are available to the customer, at his option. In some cases (for example, in Business Systems and Dealer Services) the same service is available for access and delivery by any of the three basic methods; often the nature of the service or customer determines the most appropriate method. This flexibility in suiting the customer need is becoming increasingly important in an environment where many companies that provide only one method of access or delivery are finding themselves at a disadvantage and where many customers like to choose combinations of methods for the specific services they use.

3) In the payroll sector a growing number of employees per customer is also increasing profit leverage. For the most part Automatic Data charges for its services on a per-transaction basis. Thus, in its major field—payroll services—when customer employment increases Automatic Data revenues increase. Substantial profit leverage also results since the incremental cost of processing

Table 9
Automatic Data Processing, Inc.

Change in Size Distribution of U.S. Businesses

Number of Employees	1968		1973		% Change 1973 to 1968
	Number of Businesses	% of Total	Number of Businesses	% of Total	
1- 3	1,815,244	51.8%	1,722,250	47.1%	(5.1)%
4- 7	708,594	20.2	801,476	21.9	13.1
8- 19	568,762	16.2	644,707	17.6	13.4
20- 49	252,021	7.2	298,352	8.2	18.4
50- 99	84,443	2.4	98,687	2.7	16.9
100-249	48,104	1.4	57,077	1.6	18.7
250-499	15,343	0.4	18,195	0.5	18.6
500 or more	10,942	0.3	12,169	0.3	11.2
Total businesses	3,503,453	100.0%	3,652,913	100.0%	4.3%
Total individual payrolls	54,446,130	—	61,275,142	—	12.5%

Source: Commerce Department Survey of county business patterns in 1968 and 1973.
( ) Parentheses denote decline.

transactions for additional customer employees is much less than the incremental revenue generated.

Since 1974, when the average number of "pays" per customer (a "pay" is one payroll check processed in each payroll period) was around 80 to 85, there has been a decline in average pays, to between 70 and 75 in 1977. Most of this decline was registered in the recession year of 1975; since then the average number of pays has been relatively stable as the slight rise in employment has been offset by the addition of new smaller-size customers. Average pays are currently running at about 76, an increase of about 2 in the past two to three months. We believe that there is a reasonable chance of at least maintaining this recent rate, or possibly of improving the average pays to the 78-to-80 area over the next one to two years as employment in some of the harder-hit industry sectors, such as construction, improves slightly.

4) Offering new products to existing customers provides continuing leverage. This has been a major source of internal growth in the past, in our view, and will continue to be as the base of customers expands. For example, a payroll customer generating revenues of approximately $2,000 a year is normally a prime prospect for other accounting services such as accounts receivable (with average revenues of approximately $4,000 a year) and accounts payable (with average revenues of more than $3,000 a year). Similar examples of synergism might be drawn from the other important sectors of Automatic Data's business, such as Network Services and Special Industries.

5) The costs of rendering data processing services to customers are being reduced. There has been a sustained improvement in the ratio of operating costs to revenues during the past several years. (Operating cost ratios are discussed later in the section on Financial Analysis.) Obviously, this improvement has been achieved in many different ways across the wide variety of types of service that the company offers; three examples will be cited:

First, as the revenue base of the company becomes larger it becomes easier to control many elements of fixed cost, such as costs of computer hardware, and thus increase profitability. This economy of scale has been especially important in some of the small and medium-size metropolitan batch processing centers that have now reached substantial volume levels.

Second, methods of accessing customer data and preparing them for processing by the computer have been improved. For the past three years approximately 60% of payroll input data has been received from the customer over the telephone on an exception reporting basis rather than being picked up by trucks. At most of the processing centers faster, more sophisticated, key-to-disk equipment has been installed for data preparation, replacing the older keypunch machines; the results have been higher productivity and a lower error rate.

Third, as the geographical scope of the on-line business increases it becomes possible to take advantage of time zone differences to balance the load on the computer systems. For example, the rapidly expanding European business base in Network Services permits jobs for fast response to be performed for customers in Europe during European business hours at a time when the U.S. facilities are lightly loaded.

The Unsaturated Small-Customer Market

In our view, one of the best ways to evaluate the potential for Automatic Data Processing is to examine the market for services to small customers, the core of its customer base. We estimate that between 40,000 and 45,000 of the approximately 55,000 Automatic Data customers are "small," that is, have fewer than 250 employees. Incremental services, primarily of the batch processing type in Commercial Services, for existing customers, along with the addition of new small customers, provides one of the most important sources of growth for the company.

Table 9 is a breakdown of U.S. businesses by number of employees for 1968 and 1973, derived from the Survey of County Business Patterns published by the U.S. Department of Commerce. Of 3.7 million businesses in 1973 (the latest date for which data are available) approximately 454,000, or 12%, had 20 through 249 employees. Businesses in this size group are the prime market for Automatic Data Processing services. Thus, we believe, the company currently has penetrated about 9% to 10% of its total prime market as measured by the number of companies of that size. The penetration rate is 2.0 to 2.5 times as high in some of the metropolitan areas in which Automatic Data Processing has been operating for a long time. For example, in the New York City area approximately 25% of 20-249-employee businesses are customers. In Miami (another early market for the company) the penetration is about 20%.

Furthermore, as can be seen from Table 9, the increase in number between 1968 and 1973 was greatest for the medium-size businesses, the number of businesses in the smallest size category (1-3 employees) declined by 5.1% in that period,

Table 10
Automatic Data Processing, Inc.
Size Breakdown of U.S. Businesses in Top 80 Employment Areas(a)

Number of Employees	In Top 10 Areas	In Top 20 Areas	In Top 30 Areas	In Top 40 Areas	In Top 50 Areas	In Top 60 Areas	In Top 70 Areas
1- 3	43.4%	60.3%	71.0%	78.9%	85.6%	91.4%	96.0%
4- 7	41.4	58.5	69.8	78.2	85.1	90.9	95.7
8- 19	41.5	58.5	69.7	78.1	85.0	90.8	95.7
20- 49	41.9	59.0	70.2	78.3	85.0	90.9	96.0
50- 99	42.1	59.7	70.8	78.9	85.3	91.2	96.2
100-249	42.8	60.5	71.1	79.3	85.9	91.5	96.4
250-499	43.6	61.0	71.3	78.8	85.3	81.0	96.7
500 or more	43.2	61.4	71.4	79.8	86.7	91.5	96.6
All businesses	42.5%	59.9%	70.7%	78.8%	85.5%	91.2%	96.2%
Percentage increment	—	17.4	10.8	8.1	6.7	5.7	5.1

Source: Commerce Department Survey of county business patterns (1973).
(a) Standard metropolitan statistical area, by size of total employment.

while the number in the largest size classification (500 or more employees) increased by only 11.2%. The rates of increase were between 13.1% and 18.7% for businesses in all other size categories, the company's prime markets. We expect continued penetration of the denser markets and believe that a penetration of at least 20% may be obtainable in most of the major markets over the longer term.

We estimate that Automatic Data currently operates in 35 to 40 of the top metropolitan markets. Table 10 presents a breakdown of U.S. businesses by size and by location in areas classified by total employment. On the average 78.8% of U.S. businesses are located in the 40 areas having the highest employment and 70.7%, in the top 30 areas. Automatic Data Processing operates in the areas containing approximately 75% of its total prime market; that is, of the 454,000 businesses with 20 through 249 employees, approximately 75%, or 340,000, are estimated to be located near Automatic Data centers. Thus, the 40,000-to-45,000-customer base in this size category approximates a market penetration of 12% to 13% in the areas currently served by the company.

Another potential market that we believe will be more aggressively pursued by Automatic Data is smaller companies with 8 through 19 employees. In this group we estimate the company has some 9,000 customers out of the total of 645,000 reported in the Commerce Department survey, or a penetration of only 1% to 2%. Table 10 shows that about 78%, or 503,000, of these customers are located in the 40 top employment areas.

Assuming that each 8-19-employee business could require accounting services costing $500 to $1,000 annually and each 20-249-employee business, $3,000 to $6,000 annually, we still perceive considerable potential for Automatic Data in this market, estimated to amount to $1.7 billion to $3.4 billion a year nationwide. In the top 40 employment areas this would be a $1.3-billion-to-$2.6-billion annual market, which we judge the company currently has a penetration of only 4% to 9% with revenues (in the Commercial Services sector) of about $116 million a year.

Table 10 also illustrates two other important points. First, the top 40 employment areas comprise 78.8% of the total businesses; the next 20, only 12.4%. Thus, a 50% increment in the number of employment areas covered, although it would increase the market coverage to 91.2% of businesses, would amount to a net expansion of coverage of only about 12.4% divided by 78.8%, or approximately 16%. Thus rapid extension of Automatic Data services to the remaining uncovered markets is probably unwarranted. Secondly, the data in Table 10 show an extraordinary consistency among businesses of all sizes in the proportion located in the top employment areas. For example, the top 10 areas on average contain 42.5% of the total number of businesses of all sizes, varying only from 41.4% for the 4-7-employee class to 43.6% for the 250-499-employee class. Similarly close correlation exists for all the employment areas shown in the table. This implies that Automatic Data products aimed at customers in specific size categories, such as the several types of payroll packages available, could be sold equally well in the major markets and that expansion to the smaller areas to serve customers in those size categories (which might involve greater overhead and distribution cost) is not necessary.

The Threat of Competition from Small-Business-Computer Manufacturers

Increasingly in the past two to three years, concern has been voiced by some observers about the possible near-term erosion of Automatic Data business from small customers as a result of the penetration of that market by cheaper small computers. These computers, oriented toward business and accounting data processing functions, have been introduced by IBM, Burroughs†, NCR, Sperry Rand¶, Honeywell¶, Digital Equipment, and many smaller companies. We believe there are well in excess of 50 companies currently marketing such small computer systems, which generally sell for between $20,000 and $50,000 and can be leased for as little as $700 a month.

We do not share this concern and believe that over the intermediate term these new systems are unlikely to appreciably reduce Automatic Data's growth rate because they are uneconomic for a major part of the market. The small existing or prospective customer for processing of the accounting and other data neccessary to run his business basically has three options. He may elect to engage or continue the services of a company such as Automatic Data or a competing service company; he may elect to install a small-business-computer system, such as an IBM System/32 or Burroughs B80, in his offices; or he may continue to use, or return to, manual processing by human labor, perhaps with the aid of bookkeeping machines. Comparison of the costs of these options for small customers leads us to the conclusion that for the majority of users the initiation or continuance of computer services from an independent supplier is most economic. Since Automatic Data Processing has a leading position in the market, we believe that the company is in a favorable position to benefit from the growth in the number of such customers requiring outside services.

We base this conclusion upon the analysis of costs, presented in Table 11, for the three basic options of the typical small user (one with probably fewer than 500 employees—please refer to the previous discussion of market statistics). For a standard package of accounting functions the annual costs of using an independent service company (estimated at $25,000) are from 17% to 42% lower than the costs of manual processing (estimated at $43,000) or of the in-house computer system (estimated at between $30,000 and $38,000). These latter costs are shown for two cases: 1) employing a professional manager for the

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Table 11
Automatic Data Processing, Inc.

Estimated Annual Costs of Standard Accounting Functions
for Small Businesses

	With Outside Services Supplier		In-House System				In-House Manual Processing	
			With Manager		With Operator			
	Cost	% of Total	Cost	% of Total	Cost	% of Total	Cost	% of Total
Personnel (a)	$12,000	48%	$20,000	53%	$12,000	40%	$36,000	84%
Small-system lease	—	—	9,000	24	9,000	30	—	—
Space and utilities	2,000	8	5,000	13	5,000	17	5,000	11
Supplies and accessories	1,000	4	4,000	10	4,000	13	2,000	5
Outside services (b)	10,000	40	—	—	—	—	—	—
Total Costs	$25,000	100%	$38,000	100%	$30,000	100%	$43,000	100%

(a) One clerk at $12,000 a year (including fringe benefits) is assumed for collecting and disseminating data for and from the service supplier; three such clerks are assumed for the in-house manual processing option.

(b) A standard package of accounting functions is assumed; this cost equals the approximate sum of the average cost of payroll, accounts payable, accounts receivable, and general ledger processing services from Automatic Data Processing.

installation at a fairly high annual compensation rate of $20,000, and 2) employing a sophisticated clerical operator, at an annual compensation rate of $12,000 with the computer manufacturer providing much, if not all, of the software required to process the data virtually free of charge. In our view, this analysis supports our conclusion that the growth of Automatic Data Processing revenues from the substantially untapped small-customer market will not be greatly affected by the suppliers of small systems, at least in the near to intermediate term.

Over the longer term, we believe, the cost structure shown in Table 11 would change in favor of the in-house computer system only slightly even if the costs of such a system were to be reduced significantly. About 40%, or $10,000, of the estimated total cost of the services when an outside supplier is used is composed of actual supplier charges. We expect these charges to increase sluggishly at a rate probably in the range of 1% to 3% a year, below the rate of inflation, whereas the remaining $15,000 of total cost will probably increase at the annual inflation rate, estimated at 4% to 7%. These assumptions yield a total rate of cost increase over the future of about 3% to 5%. The cost of the less expensive (without a manager) in-house solution, estimated at $30,000, includes inside costs of $21,000, which should increase at approximately the rate of inflation (4% to 7% a year). Only the estimated $9,000 system-lease cost, constituting about 30% of the total, will be affected by a decline in the price of small computers. If we assume that this system cost decreases by 10% a year and, most important, that the computer manufacturer makes no change for the software to run the system and perform the application programs (an optimistic assumption, in our view), then the total cost should increase by no more than 2% a year over the longer term. Thus, the annual rate of cost growth for the in-house-operator option would be on the order of 3% below that of the outside-service-organization option. We arrive at this differential by comparing the 3%-to-5% cost increase for the services alternative with the 0%-to-2% increase for the in-house-system solution.

We recognize that this analysis, like the other data in Table 11, can only be approximate. Nevertheless, it appears to indicate that over the longer term (perhaps 5 to 10 years) in-house systems may become more cost-competitive with outside suppliers of services than at present. We also recognize the simplified nature of many of the assumptions made in the analysis, including:

- The volume generated from the customer: We have assumed average service volumes and an in-house system with modest storage capabilities (for example, an on-line floppy disk capability of around two million bytes). A larger customer would incur a higher service cost and a higher system cost for larger system storage.
- The prevalence among small users of fearfulness toward the incorporation into their operations of sophisticated computer systems that they may understand only poorly.
- The possibility that other functions can be added to the in-house system at modest incremental costs, provided programming for these new applications can be obtained.
- The possibility that manufacturers increasingly will make available with in-house systems applications programs that will provide custom-tailored management reporting capability.
- The probability that turnaround time will improve in the in-house systems.

However, we firmly believe that the rapid decline in the cost of small business systems, which we estimate at close to 50% in the past five years, together with the increasing availability of comprehensive applications programming from manufacturers and the probability that in the future buyers of these systems will not require the services of skilled computer professionals, will make the in-house solution more attractive, especially to independent-service-company customers generating revenues in excess of $20,000 a year. We estimate that only about 2,000 customers, or 4% to 5% of Automatic Data Processing's current customer base, now pay the company more than $20,000 a year, but that this growth contributes an estimated 10% to 15% of total revenues. We therefore conclude that over the longer term increasing competition from the in-house systems alternative may cause the growth rate of Automatic Data's batch processing revenues to decelerate.

LONGER-TERM OUTLOOK

We believe that three important developments exogenous to Automatic Data Processing, which for the most part have come to the surface in the past five years, will continue to shape the environment in which the company will operate over the longer term: 1) the continuing reductions in computer hardware costs, which have brought the prices of entry-level systems to well below $25,000; 2) the rapid success and expansion of computer communication networks that provide on-line computer services to a variety of customers on a worldwide basis; and 3) the greater emphasis we expect IBM and other mainframe computer companies to place upon the selling of software and computer services (in addition to the selling of computer hardware), with the resulting potentially lower margin trends.

Earlier in this report we discussed the first of these developments and concluded that the small, cheap, entry-level computer systems are unlikely to have a discernible effect upon the growth of Automatic Data Processing for the next three to five years although they will become more competitive later as hardware suppliers become more successful in selling packaged application programs with their small-computer systems. The remaining two key exogenous developments, together with a variable over which the company has some control, to wit, the future role of acquisitions, are treated in this section of the report.

Computer Communication Networks

Computer networks, such as those of Computer Sciences (Infonet), Control Data (Cybernet), Tymshare, National CSS, and other on-line service companies, have expanded rapidly in recent years as costs of quick-response, on-line computer services have been reduced and as better managed, leaner companies with improved on-line products have emerged from the highly fragmented mix of mostly weak time sharing companies (many of them no longer in business) that existed five to eight years ago.

It is our view that Automatic Data Processing's aggressive entry into the market for on-line computer services, through the acquisition of Cyphernetics in June 1975, was belated. We suspect that the October 1972 acquisition of Computer Communications Network (CCN) was intended to provide a base for development of on-line services. However, this acquired company, which was named Autonet by Automatic Data and which provides on-line services primarily to wholesale liquor distributors, had a meretricious past record (it was close to bankruptcy in the late 1960s) and did not prove as successful within the Automatic Data fold as management had expected. Cyphernetics, in contrast, has been an excellent acquisition, and the more recent acquisitions, the Delos Group and First Data Corporation, show promise of enhancing the company's worldwide networking-services capability.

We believe that Network Services will continue to generate high pretax margins, estimated at 19% to 25% on an operating basis. (The allocation of certain corporate overhead expenses reduces these margins, as shown in Table 7, to the lower end of this range.) Profitability will probably improve slightly over the intermediate term as a result of the consolidation of First Data Corporation into the worldwide network. We believe pretax profit margins are high for the following reasons:

- The low-cost network that is used: The network employs Digital Equipment PDP-10 computers and PDP-8 concentrators and switchers, together with a variety of peripheral equipment from Ampex, Memorex, Storage Technology, and Calcomp. We believe that the combination of equipment from several vendors has allowed the network to achieve an extremely high level of performance relative to its price. In addition, the DEC equipment is particularly well suited to computer networks of this type.
- The high degree of network reliability: The central installation at Ann Arbor, Michigan, is serviced by a team of Automatic Data Processing engineers. We view this as a vital element in such a highly mixed vendor system because it eliminates conflicts among servicemen from competing vendors when equipment fails. The use of a large number of main processors (the PDP-10s) also increases reliability; even if several of the PDP-10 processors fail, the system will still operate satisfactorily.
- The low communications cost of the network: Despite the size of the network, the communication-line costs are relatively small, currently an estimated $50,000 a month domestically and $30,000 a month for the European link. These costs amount to only about 2% of the revenues generated.
- The balancing of the system load: The nationwide scope of the network and the increasing importance of European business permit more efficient utilization of the system because peak loads in different states and countries occur at different times. In addition, the low-load periods can be used to process work from the other segments of Automatic Data's business.

Although a quantified breakdown of Automatic Data's networking business has not been made public, we believe that this segment of the company's business is more profitable and better protected than many of its competitors from the softness a downturn in the economy might induce in raw time sharing operations. We expect revenues of this sector to grow over the longer term at a rate of around 20%, excluding acquisitions. This belief is based upon our estimate that only about 20% to 25% of the business of Network Services is standard time sharing services, for which the customer is not locked into the system by various special characteristics such as proprietary programs, data bases, or response times. We believe that only about 4% of revenues is derived from the scientific and engineering market, that about 30% of revenues is derived from proprietary products, and that about 60% of growth in past years has come from existing clients, with the remaining 40% from new clients. In our view, these statistics support our projection of stable long-term growth for Network Services.

The 'IBM Threat" and Long-Term Margin Trends

What is often labeled the "IBM Threat" to Automatic Data really consists of two separate threats. They are not limited to IBM but involve possible strategic moves by all computer-system manufacturers; those of IBM are, of course, the most potentially dangerous. One of these threats, possible aggressive encroachment on Automatic Data's small-customer markets by small computer systems of the IBM System/32 type, has already been discussed in this report. The other is possible greater emphasis upon the unbundling of charges for and sale of computer software and services.

In our IBM *Company Follow-Up* dated April 27, 1977, we stated in detail our reasons for believing that the computer hardware manufacturers are likely to rely increasingly upon profits generated from software and computer services over the longer term. Briefly, we expect the high pace of technological change to continue to reduce the cost per hardware function and believe that hardware *per se* can be more easily duplicated by a larger number of competitors than was the case 5 to 10 years ago because the ability to successfully design and manufacture high-quality computer equipment has become more widely disseminated. Consequently, despite possible favorable elasticity effects as hardware prices are reduced, we expect the profit leverage obtainable from hardware to decline and believe the suppliers of hardware will offset that decline by selling the associated software and service at potentially more profitable prices. These industry trends imply greater competition for Automatic Data. The entry of IBM and other mainframe manufacturers into the market for general purpose applications software, possibly in a microcoded form at some later date, will modestly reduce the profit opportunities for service companies, in our view.

Furthermore, it is unlikely that the market for specific batch service functions, such as the accounts receivable, general ledger, or accounts payable services offered by Automatic Data Processing, will ever equal that for the highly successful payroll processing service. This payroll service, which now generates an estimated $75 million in annual revenues for Automatic Data, formed the kernel of its growth in the past.

As a result of the more competitive environment for computer services over the longer term, we believe, we have seen during the past few years the implementation of several strategic countermoves by the company. Chief among them are these:

- The provision of remote batch services and the development of a worldwide communications network through the acquisitions of Cyphernetics, Delos, and First Data
- Greater emphasis upon, and continuing development of, new functional services in the accounting area such as receivables, payables, billing, and inventory
- The development and acquisition of new services for specific industries such as automobile and heavy equipment dealers, distributors, and hospitals
- A lower reliance upon geographical expansion into new U.S. cities for growth
- Emphasis upon expansion abroad, as evidenced by the recent acquisitions in Brazil, the United Kingdom, and Holland, with further acquisitions in the major European countries such as France and Germany contemplated

We believe that these moves are necessary and will put the company in a good position to capitalize upon future opportunities in the services market. However, we also believe that the increasing maturity of at least some of the industry sectors of the services market, coupled with increased competition from both the hardware suppliers and the stronger service suppliers, makes it unlikely that profitability for the company can be increased over the very long term. We expect near-to-intermediate-term pretax margins to remain in the 17%-to-20% range but would anticipate some slight erosion of profitability within the next 5 to 10 years.

Acquisitions

Acquisitions have provided one of the most important sources of growth for Automatic Data Processing. Before the past four to six years, we judge, the acquisition strategy of the company was primarily motivated by a need to expand the geographic scope of batch processing services in the major U.S. markets. Typically Automatic Data would acquire a small, usually marginally profitable batch processing organization in a metropolitan area new to the company and use it as the base for further aggressive penetration in that area. The implementation of Automatic Data methods and products; the weeding out of inferior products

Table 12
Automatic Data Processing, Inc.(a)

Analysis of Acquisitions
(Dollars in millions)

			Estimated Annual Contribution to				
Year	Acquisition	Consummation	Revenues	Pretax Income	Pretax Margin	Method of Acquisition	Division of Business
1978	Midwest Stock Exchange Service Corp.	9/77	$ 8.0	$ 1.0	13%	(b)	Financial
	Eastern Data Processing	8/77	1.5	0.15	10	Purchase	Commercial
	Association Service Corp.	8/77	0.9	Breakeven	—	Purchase	Commercial
	United California Bank Payroll	7/77	6.0	0.3	6	Purchase	Commercial
1977	Greyhound Computer	6/77	3.6	0.2	6	Purchase	Commercial
	First Data Corp.	6/77	7.5	1.1	15	Pooling	Network
	Financial Computer Corp.	3/77	2.0	0.2	10	Pooling	Special
	Affiliated Computer Systems	2/77	0.8	0.2	25	Purchase	Commercial
	CPI Group	10/76	3.5	0.9	25	Pooling	Special
1976	Systems, S.A.	4/76	2.5	0.1	4	Purchase	Commercial
	Delos(c)	4/76	7.0	Marginal	—	Purchase	Network
	ISI	4/76	0.5	Marginal	—	Purchase	Network
	PCS	3/76	1.0	Marginal	—	Purchase	Financial
	Manufacturers Hanover Payroll	11/75	2.5	Marginal	—	Purchase	Commercial
	Financial Computer Services	10/75	2.5	0.3	12	Purchase	Special
1975	Cyphernetics	6/75	16.2	3.8	24	Pooling	Network
	First National City Bank Payroll	4/75	2.0	Marginal	—	Purchase	Commercial
	Wingate Corporation	12/74	1.2	Marginal	—	Purchase	Commercial
	BASE, Incorporated	12/74	0.8	Marginal	—	Purchase	Dealer
	Instituut voor Electronische Admin.	11/74	3.0	Marginal	—	Purchase	Commercial
1974	United Data Processing, Inc.	2/74	1.8	0.09-0.18	5-10	Pooling	Special
	Cisco Nursing Home Company	11/73	0.3	Breakeven	—	Purchase	Special
	Hughes Computer Systems, Inc.	4/74	4.0	0.6	15	Purchase	Dealer
1973	National Inventory Control Systems	2/73	5.6	0.7	13	Pooling	Dealer
	C.S.I. Computer Systems, Inc.	11/72	3.2	0.2	6	Pooling	Dealer
	Computer Communications Network, Inc. (Autonet)	10/72	1.8	(0.5)	—	Pooling	Dealer
	Maley Thomas Corporation	10/72	0.3	Marginal	—	Pooling	Special
	Accounts from Minneapolis Service Company	8/72	0.5	Marginal	—	Purchase	Commercial
	Hospital Shared Computer Svs.	7/72	1.0	Marginal	—	Pooling	Dealer

( ) Parentheses denote loss.
(a) Fiscal year-end June 30.
(b) Converting customer base only at the customer's option as the Midwest Stock Exchange phases out of this business. Does not represent an acquisition in the normal sense but rather additions to customer base as conversions take place.
(c) Profits of Delos were significantly reduced by operating losses in the United States; these U.S. losses were eliminated after the merger. The major operating entity of Delos was a U.K. company, Time Sharing Limited.

previously offered by the acquired company; and the imposition of improved financial controls and, in some cases, management usually brought the acquired company up to Automatic Data levels of profits and growth within one to two years. Although geographic expansion is still being actively pursued, particularly in Europe, in the past half-decade this motivation has become less important, and the company more frequently has used acquisitions as a means of product diversification.

Table 12 shows an analysis of the major acquisitions of Automatic Data Processing in and since fiscal 1973. Only 11 of the 28 acquisitions listed are in the Commercial Services sector—the traditional batch processing business of the company—indicating the recent emphasis upon new products in the acquisition process. Examples of the new emphasis are the CPI Group and Association Service Corporation (ASC) acquisitions. CPI provides computerized administrative and securities custodial services for individuals, proprietorships, partnerships, and small corporations through IRS-approved-and-qualified master retirement and profit sharing plans. CPI concentrated its activities in California, but

Automatic Data is offering the services in many areas of the country. ASC provides unemployment-tax control services for corporations—a natural extension of service to the more than 40,000 payroll clients of Automatic Data.

The recent announcement that Automatic Data Processing will process the brokerage accounts of those customers of the Midwest Stock Exchange Service Corporation (MSESC) that desire Automatic Data to take over such processing is a major positive development for Automatic Data. (MSESC, a subsidiary of the Midwest Stock Exchange, is withdrawing from the business.) We believe MSESC revenues were slightly over $10 million annually and expect Automatic Data to generate $5 million to $10 million at an annual rate from the converted customers within three to nine months. In effect, the announcement represents the acquisition of a major competitor in brokerage services. We believe MSESC was, after Automatic Data, the second-largest provider of brokerage data processing services and estimate that following the conversions Automatic Data will have approximately 75% to 85% of the market for such services.

Measurement of the effect of acquisitions is complicated by the timing of each acquisition within the fiscal year and by the fact that some acquisitions were made on a pooling-of-interests basis and some were purchases. Table 13 presents the revenue effect of the acquisitions, showing the estimated annual revenues from the acquired companies at the time of acquisition as a percentage of the following fiscal year's reported revenues and also as a percentage of the following fiscal year's reported revenue gain (including estimated 1978 revenues). The data in Tables 12 and 13 are not intended as a comprehensive, detailed analysis of the acquisition effect. Rather, they are only an attempt to show, from a broad perspective, the approximate size of acquisitions relative to revenues and revenue growth over a period of several years in order to detect significant changes in the amount of revenues and the type of products acquired.

The data show that the revenues of the acquisitions have varied from 3.9% to 12.3% of reported revenues in the year following acquisition and from 14.4% to 69.9% (with an average for the five years of 39.8%) of the addition to reported

Table 13
Automatic Data Processing, Inc.

Estimated Revenue Contribution of Major Acquisitions
(Dollars in millions)

	Fiscal Years				
	1974	1975	1976	1977	1978(E)
A. Reported revenues	$112.3	$154.7	$187.9	$245.5	$300.0
B. Estimated revenues of major acquisitions made in preceding year(a)	12.4	6.1	23.2	16.0	17.4
C. Increase in reported revenues	22.6	42.4	33.2	57.6	54.5
B as % of A	11.0%	3.9%	12.3%	6.5%	5.8%
B as % of C	54.9	14.4	69.9	27.8	31.9
B as % of C excluding networking acquisitions	54.9	14.4	41.2	17.0	21.1

(E) Kidder, Peabody & Co. Incorporated estimates.
(a) Estimated annualized revenues at time of acquisition.

revenues in the year following acquisition. This average is comparable to that we have calculated for the four years preceding 1973, when acquisition revenues typically ranged from 20% to 40% of incremental growth. However, in the five-year period examined in Table 13 the important difference compared with prior periods is the number of new products and services acquired, especially in the on-line networking services sector. If we were to exclude the important acquisitions (all in Network Services) of Cyphernetics, Delos, and First Data, with estimated revenues totaling $30 million to $31 million at the time of acquisition, then the average percentage that acquisition revenues composed of incremental revenues would fall from 39.8% to 29.7% in the five-year period. However, these acquisitions affect only 1976 through 1978. For those three years the percentage decline is even more dramatic; specifically, the percentage falls from an average of 43.2% to 26.4%.

We believe this analysis points toward two major conclusions:

- In the recent past significantly more Automatic Data acquisitions were made to obtain new products and services, (such as CPI, ASC, and those in the networking area) than previously, when acquisitions were made primarily for geographic expansion.
- Although the average revenue contribution from acquisitions appears to be remaining stable in the range of 20% to 40% of incremental growth, acquisition profitability (see Table 12) is much higher for recent ones, a fact that implies less future leverage, in our view. As a result, the increase in profitability derived from these higher-profit acquisitions may be lower in the future than in the past.

THE MANAGEMENT CHALLENGE

In our view, the successful management of a small, fast-growing company in a highly competitive field undergoing rapid technological change presents enormous challenges. Few small technology companies—not even exceptionally high-quality companies like Digital Equipment—have weathered growth to a level of half a billion dollars in revenues without major setbacks. In our judgment, these problems frequently stem as much from the changes that must be made in internal structure as the company grows as from exogenous influences such as competition, products, and markets.

However, we believe that the quality of management of Automatic Data is exceptionally high relative to the size of the company and that there is a good chance that it can double annual revenues from the current $245 million without running into the kind of major setback that has afflicted many a small- and medium-size company.

Management Style

Automatic Data has an ethic of hard work and emphasis on results at the core of its style. There are five key members of management: The founder, Henry Taub, was recently made Chairman of the Executive Committee and is spending increasingly less time on company affairs. The Chairman and Chief Executive Officer, Frank Lautenberg, joined the company two years after its founding in 1949. The recently appointed President and Chief Operating Officer, Josh Weston, joined the management in 1970 and has been primarily responsible for Commercial Services. The Executive Vice President, Bruce Anderson, has been with the company since 1969; he has been primarily responsible for the corporate development program (mergers and acquisitions) and, more recently, for the Network Services operation. The Chief Financial Officer, Richard Patterson, went to Automatic Data in 1974 from Touche, Ross, Bailey, and Smart.

The results orientation of the company lends to rapid action in appointment of new middle- and upper-level managers when a management problem begins to come to the surface. Management turnover has not been greater than average, in our view. However, some half a dozen members of management have left in the past four years. These include Sam Linder, the previous head of the acquired National Inventory Control Systems (NICS) operation; George Voss, who was responsible for technical and product development; John Mattei, the former head of marketing; Leo Kornfeld, who was primarily responsible for the Autonet operations; and Gil Mintz and Gene Connolly, previous Chief Financial Officers. Most of these changes were appropriate, in our view, and we are expecting the present central core of 5 to 10 senior management executives to remain stable.

Budgeting Process

The budgets of the company are set in what appears to be a "top-down" process, by which top management sets initial targets and then reaches agreement on goals with the managers of the approximately 50 to 60 profit centers. A matrix-like arrangement determines the bonus structure. The elements of the matrix are various revenue percentage increases on one axis and various profit margins for those revenues on the other. Each intersection of these lines represents a level of bonus for the profit center manager. The goals take into account the fact that in some areas both margin and revenue growth may be easier to achieve for various reasons, such as starting from a small base or having a large market to penetrate. The initial upper-management targets are set by Messrs. Weston, Anderson, and Patterson. Basic budgeting inputs are data such as new accounts, demographics, existing sales, and new product programs. All direct costs, nearly all of them under the direct control of the manager, are charged to the profit center. The bonuses of approximately 300 to 400 persons in the organization are tied to budget performance.

The company maintains a detailed one-year planning cycle on a 12-month rolling budget. Some parts of the budget extend farther into the future; the computer plan is for two years, and the facilities expansion plan is for five years. A major advantage for the company in budgeting is the rental nature of many of the businesses in which it participates. In the basic fiscal-year budgeting process, which commences in January, the plan begins with consideration of new sales, considers lost business ratios, and sets targets for new revenue growth primarily on the basis of market penetration in various product sectors and geographical areas. Commercial Services is one of the easier major sectors to budget because of the large number of small customers serviced. Network Services is somewhat more volatile. From a predictability standpoint, the most difficult is the Financial Services division, primarily because of its dependence upon the volume of trading done on U.S. stock exchanges; however, in the past several years this dependence has been substantially reduced from between 75% and 80% to the current 50%.

The performance of the profit centers is reported monthly. For most of them, preliminary data are available within three or four days following the end of the month and results are final less than two weeks after the end of the month. Although typically as many as half of the profit centers fail to meet budgets for revenues and/or profits, it is rare for total variance from revenue or profit budgets to exceed 5%.

Probable Changes in Control Structure

The financial control structure of the company has been characterized as "decentralized with strong central awareness," a description that appears to us to be apposite. The existence of 50 to 60 separate profit and cost centers, each typically comprising either a geographical area or a specific type of product, enables the head of each center to act entrepreneurially. Nearly all of these profit centers report to one of two executives, Mr. Josh Weston or Mr. Bruce Anderson. We believe this structure has been a major factor in the success of Automatic Data Processing to date. However, we expect that a combination of forces will necessitate a change to a type of structure more appropriate and usual for a larger company. These forces include the following:

- The rapidly increasing size of the company
- The increasing overlap among products: For example, payroll processing for an automobile dealer in Dealer Services might be considered a Commercial Services function
- The overlap among types of customer services: For example, a customer may want both on-line and batch methods used for parts of the data input or delivery for a given service, or the customer may want a change in the designated method because of changes in his business or conditions exogenous to both Automatic Data and his operations
- The probability of intensification of competition among the many profit centers within the company as services and geographical areas overlap, which could be unhealthy
- The wide span of control of the two executives to whom the majority of the profit center heads report
- The increasing difficulty of providing performance incentives for profit center heads through stock options and other stock-related plans (methods used extensively in the past) as the company becomes larger and more stable and grows less rapidly

These forces are likely to produce structural changes, whose success will be one of the keys to the future of the company, in our view. Over the next one to three years, we would expect to see more responsibility for supervision of profit centers delegated to levels below those of the President (Mr. Weston) and the Executive Vice President (Mr. Anderson), who then will have fewer persons reporting directly to them; the establishment of more cost centers within the company; and a consolidation of profit centers. These changes could decrease the role of stock options and contingency payouts in middle-management incentive plans and will probably reduce the entrepreneurial flavor of the company for all but the senior executives.

We believe this type of structural change is perceived as necessary by several members of management, an important awareness that has often been absent in other dynamic young companies. It is our view that Mr. Lautenberg, who has been a key orchestrator of many past management and structural changes, will be an important instigator of future moves in the general areas outlined above. The recently instituted Task Force 80, which consists of eight senior executives drawn from widely different areas of the company assisted by the faculty of the Harvard Business School and the consulting firm of McKinsey & Company, will help set the direction of future corporate policy and planning. We expect Task Force 80's work to facilitate some of the structural changes that are going to be necessary over the next half-decade.

Litigation

In October 1976 Statistical Tabulating Corporation (STC) filed suit against Automatic Data Processing in the U.S. District Court for the Northern District of Chicago charging violation of the antitrust laws (monopolization of the market for financial batch processing services) and asking for damages of $25 million (before trebling) and other relief. Although this suit, which, we believe, will be only a nuisance for Automatic Data, could be protracted if not settled out of court, it is unlikely to have any significant effect upon the future of the company. (See our *Comment* dated November 5, 1976, for a full discussion of the allegations made in the suit and the possible responses of the company.) Our opinion, in brief, is that the alleged monopolization will be hard to prove, since Automatic Data's relatively small market share (mentioned earlier in the report) offers a potentially strong defense.

FINANCIAL ANALYSIS

Computer service companies generally have stronger financial ratios than companies in most other industries primarily because such a small base of assets is needed to generate sales. There is little heavy investment in manufacturing plant. The "production" facilities in most cases consist of computer equipment located at the major sales offices; as a result, there is a considerable saving of overhead cost compared with industries that have separate plant and marketing facilities. Furthermore, the incremental cost of "production units" or computer services is often very low for two reasons: First, a major part of the investment made to produce services consists of software whose incremental cost is virtually zero. Second, the execution of the software on a computer system is often very inexpensive; because the system may not be used 100% of the time the variable costs of the execution are extremely low.

The financial characteristics of Automatic Data are no exception to these general computer service company parameters. The company has an exceptionally strong balance sheet with excellent cash throw-off.

Balance Sheet Analysis

Reported balance sheet data and selected financial ratios for the fiscal years 1971 through 1977 are presented in Table 14. Because of the considerable number of acquisitions made by the company, restated data are shown only for the year 1976. Return on average equity has varied between 15.9% and 20.5% in the period (with an improving trend during the past three years), which compares very favorably with the returns achieved by most technology companies. Similarly, return on average capital has varied between 12.5% and 18.5%. Long-term debt is minimal, currently at 6.5% of total capital.

We judge the balance sheet to be of high quality. However, two items, considered minor blemishes (one of which was eradicated in fiscal 1975) by some observers deserve mention:

- The capitalized systems development cost, mostly for investments made in new software, of just over $4 million was eliminated in fiscal 1975 in conformity with accounting regulations implemented at that time. This cost, which amounted to approximately 16 cents a share, or about 20% of net earnings, was one of the few departures from fiscal conservatism displayed in the history of the balance sheet. We emphasize that such investments were capitalized before 1975 by many high-quality companies; because software is a major part of the investment needed to produce computer services, there is some reason to regard it in the same way as depreciable plant facilities. Nevertheless, in our view, software costs should be classified (and now are) as R&D expenditures to be flowed through the income statement as incurred. We also note that the financial management of the company has changed since this capitalization policy was in effect; we believe that the current management would not have approved of this practice.
- As a result of the many acquisitions made by the company, goodwill, currently (1977) amounting to $1.71 a share, is substantial. The policy has been not to amortize the excess cost over the net assets acquired of the investment in new subsidiaries because management believes no diminution in

Table 14
Automatic Data Processing, Inc.(a)

Balance Sheet(b)
(Dollars in thousands)(c)

	1971	1972	1973	1974	1975	1976	1976(R)	1977
Assets								
Current assets								
Cash and marketable securities	$13,162	$18,282	$16,535	$18,732	$ 24,979	$ 26,533	$ 28,153	$ 22,239
Accounts receivable(net)	7,431	9,589	13,342	15,995	21,492	26,515	28,724	35,001
Inventories	766	976	1,177	2,562	3,998	6,321	6,374	7,014
Other	873	1,040	1,580	1,810	2,649	2,699	6,188	2,927
Total current assets	$22,232	$29,886	$32,634	$39,099	$ 53,118	$ 62,068	$ 69,439	$ 67,181
Gross property, plant and equipment:								
Land and buildings	2,173	2,318	2,840	5,403	7,174	9,206	10,170	25,953
Data processing, office and delivery equipment	4,689	5,509	12,229	16,187	29,684	41,983	43,781	67,857
Furniture, fixtures and leasehold improvements	4,346	5,220	7,820	9,113	12,410	14,514	15,188	15,309
Total	$11,208	$13,047	$22,889	$30,703	$ 49,268	$ 65,703	$ 69,139	$109,119
Less accumulated depreciation	3,293	4,357	6,670	9,095	16,141	22,709	23,277	33,098
Net property, plant, and equipment	7,915	8,689	16,219	21,608	33,127	42,994	45,862	76,021
Notes receivables and other assets	1,946	2,103	1,953	2,112	2,864	3,334	3,589	2,121
Systems development cost	1,632	2,045	3,542	4,054	–	–	–	–
Goodwill	4,960	6,455	9,222	12,731	16,568	23,907	23,971	25,287
Total assets	$38,686	$49,178	$63,570	$79,604	$105,677	$132,303	$142,861	$170,610
Liabilities and stockholders' equity								
Current liabilities								
Accounts payable	$ 1,571	$ 1,605	$ 2,902	$ 2,301	$ 4,059	$ 6,893	$ 8,677	$ 6,097
Dividends payable	–	–	–	–	–	846	846	1,457
Accrued expenses and other current liabilities	1,787	2,596	2,322	2,520	5,319	7,865	8,941	9,097
Taxes	1,490	1,507	168	3,379	7,605	11,070	12,172	11,632
Current maturities on long-term debt	337	131	318	192	1,384	1,226	1,266	1,959
Total current liabilities	$ 5,185	$ 5,839	$ 5,710	$ 8,392	$ 18,367	$ 27,900	$ 31,902	$ 30,242
Long-term debt	200	201	527	599	4,289	2,719	5,179	9,215
Deferred taxes	966	1,257	2,783	3,484	2,786	3,165	3,406	6,403
Stockholders' equity								
Common stock at par value ($0.10 a share)	566	579	622	636	702	1,420	1,477	1,494
Capital in excess of par value	17,269	20,388	34,534	36,617	37,142	39,890	41,196	44,438
Retained earnings	14,803	21,273	20,156	30,217	43,027	57,735	60,227	79,265
Total	$32,638	$42,240	$55,312	$67,470	$ 80,871	$ 99,045	$102,900	$125,197
Less treasury stock	303	359	359	109	182	101	101	157
Less restricted stock plan compensation	–	–	403	232	454	425	425	290
Total	$32,335	$41,882	$54,550	$67,129	$ 80,235	$ 98,519	$102,374	$124,750
Total liabilities and stockholders' equity	$38,686	$49,178	$63,570	$79,604	$105,677	$132,303	$142,861	$170,610
Selected financial ratios								
Current ratio (times)	4.29	5.12	5.72	4.66	2.89	2.22	2.18	2.22
Quick ratio (times)	3.97	4.77	5.23	4.14	2.53	1.90	1.78	1.89
Cash and marketable securities/current assets	0.59	0.61	0.51	0.48	0.47	0.43	0.41	0.33
Receivables/current assets	0.33	0.32	0.41	0.41	0.40	0.43	0.41	0.52
Inventories/current assets	0.03	0.03	0.04	0.07	0.08	0.10	0.09	0.10
Collection period (days)(d)	49.4	49.3	47.7	47.7	45.6	46.0	NA	46.7
Percentage of total capital								
Debt	0.6%	0.5%	0.9%	0.8%	4.9%	2.6%	4.7%	6.5%
Deferred taxes	2.9	2.9	4.8	4.9	3.2	3.0	3.0	4.6
Equity	96.5	96.6	94.3	94.3	91.9	94.4	92.3	88.9
Return on average equity(d)	16.4%	17.4%	18.0%	15.9%	18.6%	19.8%	NA	20.5%
Return on average capital(d)	15.7	12.5	16.8	16.9	17.2	18.4	NA	18.5
Return on average total assets(d)	13.4	10.9	14.7	14.3	14.6	14.8	NA	14.9
Per-share statistics								
Sales	$ 4.42	$ 5.44	$ 7.28	$ 8.87	$ 11.11	$ 13.33	$ 13.63	$ 16.60
Earnings	0.44	0.57	0.70	0.82	0.99	1.26	1.28	1.58
Book value	2.91	3.67	4.43	5.30	5.76	6.99	7.00	8.44
Average shares outstanding *(in thousands)*(e)	11,100	11,424	12,320	12,650	13,920	14,100	14,616	14,786

Note: Numbers may not add to totals because of rounding.
NA Not available.
(E) Kidder, Peabody & Co. Incorporated estimates.
(a) Fiscal year-end June 30.
(b) As reported.
(c) Except per-share data and ratios.
(d) Averages calculated on restated numbers where applicable.
(e) All per-share data adjusted for stock splits.

Table 15
Automatic Data Processing, Inc.(a)

Flow of Funds(b)
(Dollars in thousands)

	1971	1972	1973	1974	1975	1976	1977	1978(E)(f)	1979(E)(f)
Sources of funds									
From operations:									
Net earnings	$4,807	$6,470	$ 8,547	$10,339	$13,848	$17,660	$23,308	$28,000	$33,800
Expenses not requiring outlay of cash									
Depreciation and amortization	872	1,095	2,232	3,152	5,645	7,502	11,462	16,000	22,000
Amortization of intangibles(c)	473	715	1,219	2,020	497	531	772	500	500
Deferred taxes	90	291	1,239	701	575	379	2,997	3,500	4,000
Restricted stock plan compensation—earned	—	—	111	122	119	113	127	—	—
Total funds from operations	$6,242	$8,571	$13,348	$16,334	$20,684	$26,185	$38,666	$48,000	$60,300
Proceeds from sales of common stock and stock options	1,319	2,033	4,208	1,552	673	2,040	2,371	3,500	4,000
Disposition of property, plant and equipment	—	—	1,101	786	1,028	1,907	2,991	1,000	2,000
Increase in long-term debt	—	131	—	—	3,401	372	5,241	—	—
Other sources	587	1,229	1,305(d)	677	1,404(e)	1,563	2,593	4,000	4,000
Total	$8,148	$11,964	$19,962	$19,349	$27,190	$32,067	$51,862	$56,500	$70,300
Uses of funds									
Long-term net assets acquired through purchase acquisition	$ 719	$1,525	$ 2,088	$ 4,165	$ 6,199	$ 7,830	$ 2,916	$ 6,000	—
Capital expenditures	3,167	2,018	8,997	8,676	11,629	14,234	42,845(g)	40,000	$40,000
Reduction of long-term debt	422	130	1,520	291	2,259	4,626	1,584	3,000	3,000
Systems development costs	815	1,092	2,419	2,123	—	—	—	—	—
Cash dividends	—	—	—	628	1,268	2,952	4,043	6,000	7,500
Net additions to excess of cost of investments in subsidiaries	—	—	—	—	323	1,866	121	—	—
Increase in other intangibles	—	—	—	—	323	432	439	—	—
Equity transactions of pooled companies prior to acquisition	—	—	—	—	1,913	—	504	—	—
Other applications	198	200	224	122	649	710	8	—	—
Total	$5,321	$4,965	$15,248	$16,005	$24,563	$32,650	$52,460	$55,000	$50,500
Increase/(decrease) in working capital	$2,827	$6,999	$ 4,714	$ 3,344	$ 2,627	$ (583)	(598)	$ 1,500	$19,800

(a) Fiscal year-end June 30.
(b) As reported.
(c) Amortization of systems development costs included in this category for fiscal years 1971, 1972, 1973, and 1974.
(d) Includes equity transactions of $330,000 of pooled companies prior to acquisition.
(e) Includes proceeds of $834,000 from sale of certain operations.
(f) These estimates do not include any provision for the effect of possible future acquisitions.
(g) Includes approximately $5 million of additions as a result of a fire at the premises of First Data Corp.

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value has occurred. However, in accordance with Opinion No. 17 of the Accounting Principles Board, most of the goodwill (amounting to 75% of the total, or $1.28 a share) is being amortized over 40 years, resulting in a current annual charge to earnings of approximately $470,000 or 3 cents a share. Although we recognize that not to amortize part of the goodwill is considered by some analysts as less than conservative, we believe that the performance record Automatic Data has achieved with acquired subsidiaries helps to justify the practice. In addition, because of the previously cited characteristics of the computer service industry, in which sales and profits generated per asset dollar are high, it is often prudent to make an acquisition (which may generate goodwill) on the basis of the current earnings (or potential earnings) of the acquired company.

Cash Flow Analysis

Cash flow data for the fiscal years 1971 through 1977, together with our estimates for 1978 and 1979, are presented in Table 15. Automatic Data's cash flow is exceptionally strong. In the six years from 1971 to 1977 reported funds from operations increased by a factor of more than 4, from $6.2 million to $38.7 million. Of the $32.5 million increase, $18.5 million, or 57%, was generated from increased net earnings, and $10.6 million, or 33%, from increased depreciation expense. This cash flow was used for three primary funding purposes—for the purchase of acquisitions,

Table 16
Automatic Data Processing(a)

Operating Record 1968-77(b)
(Dollars in thousands)(c)

	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
					Amount					
Revenues	$15,887	$26,704	$39,107	$49,043	$62,141	$89,653	$112,265	$154,682	$187,922	$245,487
% Change	–	68.1%	46.4%	25.4%	26.7%	44.3%	25.2%	37.8%	21.5%	30.6%
Expenses										
Operating	$10,670	$17,971	$26,347	$31,898	$38,511	$53,245	$ 61,766	$ 84,440	$100,701	$122,570
SG&A	1,985	3,530	5,119	6,521	9,024	16,171	24,806	31,020	38,651	57,259
Systems development and programming	NA	NA	NA	NA	NA	NA	NA	5,319	5,327	6,881
Interest	36	89	90	39	34	64	27	580	309	571
Depreciation and amortization	221	479	910	1,345	1,810	3,451	5,172	6,142	8,033	12,234
Earnings before taxes	2,975	4,634	6,640	9,240	12,762	16,722	20,494	27,181	34,901	45,972
% Change	–	55.8%	43.3%	39.2%	38.1%	31.0%	22.6%	32.6%	28.4%	31.7%
Taxes	$ 1,388	$ 2,307	$ 3,275	$ 4,433	$ 6,291	$ 8,175	$ 10,155	$ 13,333	$ 17,241	$ 22,664
Tax rate	46.7%	49.8%	49.3%	48.0%	49.3%	48.9%	49.6%	49.1%	49.4%	49.3%
Net income	$ 1,587	$ 2,327	$ 3,365	$ 4,807	$ 6,470	$ 8,547	$ 10,339	$ 13,848	$ 17,660	$ 23,308
% Change	–	46.6%	44.6%	42.9%	34.6%	32.1%	21.0%	33.9%	27.5%	32.0%
Shares outstanding *(in thousands)*	8,934	9,582	10,782	11,100	11,484	12,320	12,650	13,920	14,100	14,786
Earnings per share(d)	$ 0.18	$ 0.24	$ 0.33	$ 0.43	$ 0.58	$ 0.70	$ 0.82	$ 0.99	$ 1.26	$ 1.58
					Percent of Revenues					
Revenues	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Expenses										
Operating	67.2	67.3	67.4	65.0	62.0	59.4	55.0	54.6	53.6	49.9
SG&A	12.5	13.2	13.1	13.3	14.5	18.0	22.1	20.1	20.6	23.3
Systems development and programming	–	–	–	–	–	–	–	3.4	2.8	2.8
Interest	0.2	0.3	0.2	0.1	0.1	0.1	0.0	0.4	0.2	0.2
Depreciation and amortization	1.4	1.8	2.3	2.7	2.9	3.8	4.6	4.0	4.3	5.0
Earnings before taxes	18.7	17.4	17.0	18.8	20.5	18.7	18.2	17.6	18.6	18.7
Taxes	8.7	8.6	8.4	9.0	10.1	9.1	9.0	8.6	9.2	9.2
Net income	10.0	8.7	8.6	9.8	10.4	9.5	9.2	9.0	9.4	9.5

Note: Numbers may not add to totals because of rounding.
NA Not available.
(E) Kidder, Peabody & Co. Incorporated estimates.
(a) Fiscal year-end June 30.
(b) As reported except for number of shares and earnings per share, both of which have been adjusted for stock splits.
(c) Except per-share data.
(d) Primary. Dilution due to stock options cannot be calculated because it is dependent on the stock price at fiscal year-end.

amounting to $2.9 million, or 6% of the 1977 total sources of funds, for capital expenditures, amounting to approximatley $37.8 million, or 73% of the 1977 sources, and for the payment of $4 million in dividends or 8% of sources.

In fiscal 1977, reported capital expenditures increased significantly from $14.2 million to an estimated $37.8 million. (The capital expenditures for fiscal 1977 were inflated by the inclusion as additions to capital items of approximately $5 million of expenditures resulting from a fire at First Data Corporation. The fire damage was fully insured. Hence, for purposes of analysis a more useful amount for fiscal-1977 capital expenditures is $37 to $38 million rather than the $42.8 million in the flow of funds statements.) Expenditures on land, buildings, and furniture amounted to $17 million. Most of the increase in expenditures, however, was accounted for by the $20 million invested in computer systems and other production facilities. Major additions were made to Network Services computer systems in Ann Arbor, Michigan, and London, England, amounting to approximately $7 million. The company also purchased several IBM System/370 computers (models 138 and 148) late in the fiscal year because computer leasing companies were not prepared to offer the traditional two-to-three-year leases on those models; these purchases amounted to an estimated $4 million to $5 million. We expect the level of capital expenditures to be stable in fiscal 1979, after a slight increase in 1978 to an estimated $40 million, and believe that these expenditures can be funded internally.

The move to this higher level of expenditures—in the area of $35 million to $40 million a year, compared with $14 million in 1976—is necessary, in our view, to capitalize upon the opportunities that the company has. It is consistent with three major influences: 1) the increasing wealth of products the company has to leverage, primarily on a geographic basis; 2) the continuingly rapid expansion of the sales force to enhance that product leverage with existing and new customers; and 3) the probability that many future acquisitions, like those of the recent past, will have achieved a higher level of profitability in revenues, and be more viable as independent companies, than acquisitions made in the 1965-74 period; this will necessitate relatively higher purchase prices and, probably, increases in goodwill. The latter change may be significant enough to cause the company to utilize its considerable capacity for debt expansion although we think it unlikely that the debt to total capital ratio will exceed 20% to 25% over the intermediate term and believe that it would reach that level only if an exceptionally attractive purchase acquisition opportunity presented itself.

Income Statement Analysis

The major items constituting the reported income statement are analyzed in Table 16 for the 10-year period 1968-77. Compound growth rates of reported revenue, pretax income, and net income for the period were 31%, 32%, and 30%, respectively.

In addition to the strong growth exhibited in this 10-year record there are, in our judgment, two key facts shown in the table. First, the pretax margin has been high and exceptionally stable, varying only between 17.0% (in 1970) and 20.5% (in 1972). Second, although general, administrative, and selling (SG&A) expenses have increased steadily as a percentage of revenues, a dramatic decline in the ratio of operating expense to revenue from the level of between 67% and 68% in 1968-70 to between 49% and 54% in 1976-77 has more than offset the rise in SG&A expense. The steady increase in the SG&A expense ratio is due primarily to the normal inflationary trend of wages during the period and to the cost of the increasing corporate structure necessary to control the rapid growth of the company. The operating expense ratio (which declined through most of the period, by over 17 percentage points from 67.4% in 1970 to 49.9% in 1977) has benefited from the increase in product leverage as the company expanded geographically to nearly all the major U.S. cities and from the decrease in the unit cost of services production as a result of the declining cost of computer system equipment and the efficiencies of computer use that resulted from expanded volume.

In our judgment, the rate of increase in the SG&A expense ratio will moderate as inflation becomes more an important cause of the increase in this ratio than geographic expansion and management overhead. Similarly, the rate of decline in the operating cost ratio should moderate over the longer term as the product leverage factor becomes relatively less important compared with the decrease in unit production costs resulting from continuing reductions in the unit price of computer equipment. We therefore believe that the balance between declining operating costs and increasing SG&A expense can be maintained and that the pretax margin should continue to be stable in the 17%-to-20% range. Our detailed earnings estimate for fiscal 1978 (shown in Tables 7 and 8) reflects some slight erosion of pretax margin resulting primarily from continuing investment in new facilities, products, and programs (with systems development and programming cost increasing as a percentage of revenues) and from higher depreciation levels stemming from the expanded level of capital expenditures in 1977 and projected for 1978. For 1979 we project a flat trend in pretax margin as a higher level of revenues is generated from these investments.

CONCLUSION

We conclude that Automatic Data Processing is one of the few investment-grade computer services companies. In our view, the past operating record, the anticipated long-term future growth rate of earnings (projected at 15% to 20% a year), the quality of management, and the opportunities for profit in both the U.S. and foreign markets served convince us that the company is in a good position for future growth. We believe the shares are undervalued; using a 12%-to-13% discount rate for the market as a whole, our Equity Valuation Model computes a theoretical price for the stock of 28 to 35. Automatic Data Processing remains a recommendation of the Kidder, Peabody Portfolio Strategy Group.

William D. Easterbrook
Joan McKay

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†Kidder, Peabody & Co. Incorporated was manager or co-manager of the most recent public offering of securities of this issuer.

¶Kidder, Peabody Securities Limited, a wholly owned subsidiary of Kidder, Peabody & Co. Incorporated, usually makes a market in the convertible Eurobonds of this company and accordingly may have a position in them that may be increased or decreased from time to time.

July 15, 1977

Computer Sciences Corporation

Annual Report Summary - 1977
(Fiscal Year Ending 3/31/77)

(1) Products/Services:

- International network service was increased by the addition of Amsterdam, Rotterdam and The Hague to the other European centers served by satellite from the U.S.
- Increased its ownership in Computer Sciences Canada, Ltd. to 83%.
- Installation of computer center in Madrid, offering full INFONET services.
- IBM service to be introduced into its network during the current fiscal year as a supplemental capability to CSTS (Computer Sciences Teleprocessing System) service.
- Emphasis for application products has been placed on systems for financial analysis, reporting, planning, budgeting and forecasting; manufacturing applications; banking applications; scientific-engineering applications; and general accounting applications.

(2) Facilities:

- A third computer center was built near Washington, D.C. to supplement the L.A. and Chicago centers.

(3) Financial:

- The last 3 years key income statement items are (in $ millions):

	1975	1976 (% Chg.)	1977 (% Chg.)
Revenues			
INFONET	$37.9	$48.5 (28%)	$57.8 (19%)
Contract Services	139.4	171.4 (23%)	176.9 (3%)
Total	$177.3	$219.9	$234.7
Pretax Margin		6.6%	9.0%
Pretax Profit		$14.5	$21.2
Net Income	$3.6	$7.2	$11.6 (61%)
EPS	$.26	$.51	$1.02

Financial (Cont'd.)

- 83% of total revenues were from federal, state, local & foreign government contracts.

- Poor revenues growth (3%) of Contract Services was attributed to:

  - -Diminished revenues from Europe & the Mideast
  - -Slowdown in federal government revenue growth
  - -The phasing down of a large project near completion in Canada

  However, several major contract awards were received in 4th Qtr '77, with good order input in the commercial sector, including 2 five-year facilities management contracts. '78 revenue growth is expected to return to its prior levels.

- INFONET's operating income increased by 25% to $13.7 million (before allocating interest expense and corporate overhead).

- INFONET revenue breakdown - 1977:

Commercial Markets (35% of Total)	$	%
Manufacturing	6.2	30
Services	7.0	34
Utilities & Transportation	2.7	13
Finance & Insurance	2.0	10
Other	2.7	13

Commercial INFONET Revenues: $20.5mm

Federal, State and Local Government Markets (65% of Total)	$	%
GSA	13.1	35
Defense	10.1	27
Agriculture	2.6	7
Social Security	2.6	7
Other	9.0	24

Government INFONET Revenues: $37.3mm

(4) Outlook:

- Continued expansion of INFONET through direct service, joint venture companies or licensing agreements.

- Integration of minicomputers into the network to handle distributed computing applications.

- Further growth of CSC services within the federal marketplace under recent GSA contract.

MAY 1977

Tymshare, Inc.

Annual Report Summary - 1976

(1) Products/Services:

- MAGNUM OPUS - This specialized MAGNUM data management subsystem installed in several companies during 1976, improves the flow of information vital to manufacturing firms. OPUS allows even the small firms to introduce computerized materials requirements planning (MRP) techniques into daily operations, and can be integrated with main-line functions such as production scheduling, sales order entry and other accounting applications.

- PERS - Limited marketing of a new Personnel Evaluation and Reporting System (PERS) was initiated during the latter half of 1976. PERS addresses key personnel information areas, such as affirmative action, attendance, benefit programs, safety and retirement, and simplifies compliance reporting for federal requirements.

- FOCUS - This new data base management system for the IBM 370 developed by a third party combines large-scale capability with simplified reporting and information analysis. FOCUS was in use by some 50 clients prior to commercial release in the areas of personnel, production management, market research and project control.

- Groundwork laid for addition of several new bank services and application products during 1977, with doubling of the number of bank customers in 1976.

- Broad reorganization of 400 person marketing operations; three marketing subdivisions created:

  Information Services - provides remote computer services to thousands of customer organizations through some 50 sales offices coast to coast.

  Industry Services - Serves specialized industry and business sectors including tax, cable TV, fuel oil, health care and travel agencies.

  Marketing Services - Headquarters organization responsible for product planning, marketing, training, etc.

- TCM (Tymshare Computer Maintenance) gained additional customers and contracts for maintenance and refurbishment services in support of installed computer systems such as JPL. Now services 70 computers for 20 organizations.

- Valcomp division signed agreement to manufacture and sell spare parts for several Ampex-manufactured digital tape drives.
- Obtained FCC approval to offer common carrier communications service through Tymnet, Inc.
- Completed new joint ventures overseas for W. German (Taylorix-Tymshare GmbH) and Japanese (Marubeni Corporation) affiliates to provide Tymshare services.
- Increased investments in French markets:

  CEGOS-Tymshare - Increased its equity ownership from 20%-45% for approximately $1.1 million case in this firm which markets services in France, Belgium, The Netherlands, Luxembourg & Switzerland.

  SLIGOS, S.A. - Increased its equity interest to 20% in this French computer services operation.

(2) Facilities:

1976 Acquisitions:

Medical Data Systems (Mahwah, N.J.) - provides health care industry services. $3.1 MM in revenues.

Unitax, Inc. (Anaheim Calif.) - tax processing services. $4.2 MM in revenues.

Simplified Data Processing (Long Island, N.Y.) - provides on-line service to heating oil distributors. $2 MM in revenues.

Western Twenty Nine, Inc. (San Francisco, Calif.) - provides remote computer services for the travel industry in U.S. & Canada.

Tymshare has 36 computers in its on-line network, and 15-20 CPU's in batch processing centers.

(3) Financial:

- The last 3 years key income statement items are (in $ millions):

	1974	1975		1976	
Revenues	$52.6	$64.4	(22%)	$81.8	(27%)
Pretax Margin	13%	15.5%		16.6%	
Pretax Profit	$ 6.1	$ 9.2	(51%)	$13.2	(43%)
Net Income	$ 3.6	$ 5.1	(42%)	$ 6.7	(31%)
EPS	$ .91	$1.22		$1.55	

- Acquisitions accounted for approximately 1/3 of revenue gain.

(4) Outlook:

- 1976 achievement was somewhat lower than forecast as the result of some third quarter difficulties which resulted in a disastrous decline in Tymshare's market price and a somewhat dented image. Tymshare's revenue performance was flat for the four quarters of 1976. Because of this, 1977 will be a critical year in terms of recovery from these events.

  Based on Tymshare's recent performance, however, and assuming a continuing acquisition program along with the initiation of development projects which take advantage of minicomputers and/or intelligent terminals, Tymshare is likely to reach its objective of a 20% pretax level by 1980.

- First quarter 1977 results were reported on May 16 and showed a 12% revenue gain and a 6% increase in net income. EPS for the quarter were $0.60 vs. $0.57 last year. The rate of gain was adversely impacted by the seasonality of Unitax and the change in the fiscal reporting period. The 1977 first quarter included Unitax results for January - February, while 1976 included March - April.

- Full year is expected to be 100^+$ MM in revenues and $1.85-$1.90 in EPS.

May 17, 1977

National CSS, Inc.

Annual Report Summary

(1) Products/Services:

- NOMAD - This is a data base language similar to IPL. It was introduced in fiscal 1976 and has grown consistently since then. Revenues for fiscal 1977 were $5.0 million, increasing from $649,000 in the first quarter to $1.4 million in the fourth. There are presently 800 users.
- EMS - Economic Modeling Service represents a new offering and provides access to the data base maintained by Merrill Lynch Economies.
- Revenue breakdown - Basic timesharing and application services account for the largest portions of revenues (38% each). Over the past 5 years, basic timesharing revenues have declined from 70% of revenues to 38%.

(2) Facilities:

- 470/V6 - NCSS installed a 470/V6 last year. A 370/168 replaced 3 67s in Sunnyvale and a 158 was installed on a dedicated basis for Pacific Telephone and Telegraph. There were 5 large systems installed at year end.
- Capacity - With the additional hardware, NCSS was running at 60% of available capacity at year end.
- Network - utilizes 26 minis and 60,000 miles of communications lines covering more than 100 cities in Europe and North America.
- Sales Offices - 5 new locations (Minneapolis, Detroit, Denver, Dallas and Pittsburgh)
- New Headquarters - a new 70,000 sq. ft. building is planned for Wilton, Conn.

(3) Financial:

- The last 3 years key income statement items are (in $ millions):

	1975	1976	1977
Revenues	$32.6	$35.6 (9%)	$41.7 (17%)
Pretax margin	11%	12.3%	13.1%
EPS	$1.67	$1.95	$2.81
Net Income	$1.8	$2.1 (18%)	$3.2 (49%)
Pretax Profit	$3.5	$4.3	$5.4

- Investment Tax Credit - ITC from the Amdahl 470/V6 contributed $642,000 to earnings and reduced the tax rate from 50% to 41%.

- Cash Flow - totaled $6.0 million, up from $3.9 million.

- Balance Sheet - cash and equivalent was $6.7 million, 27% total assets. Considerable high cost debt was added to finance the new hardware and headquarters (interest rates are 10½% and 8-7/8% respectively). Total debt was $5.4 million, 29% of total capital.

(4) Outlook:

- Second half revenue growth was 16% as compared with 19% in the first half. With the absence of the ITC boost, growth in reported results is unlikely to top 15% for fiscal 1978.

August 30, 1977
G-1328-WSP-163

To: R. W. Tharrington

From: W. S. Pyles

cc: Richard Henderson

Subject: Computer Sciences Corporation (CSC)

I have attached a Competitive Profile write up as well as a five year financial history and current organizational chart of the subject corporation. In addition to the information attached the following observations seem appropriate:

- CSC over the past two years has significantly increased its profitability and has reduced its long term debt. In order to sustain further growth, it is planning in significantly expanding and strengthening its commercial marketing force and mounting an aggressive acquisition program.

- It is anticipated, as a result of the GSA TSP procurement, effective September 30, 1977 that INFONET's government base may erode as much as 25% by 1980. However, sufficient additional agencies growth within the federal government, as a result of this TSP procurement, will result in sufficient new opportunities that INFONETS revenue is expected to continue its growth not withstanding the anticipated erosion.

- Historically CSC's major weakness has been in its marketing and support force. Approximately a year and a half ago CSC began strengthening this area and continued expanding and strengthening is anticipated throughout the balance of this decade.

- Currently INFONET revenues divide 61% to 39% in government and commercial sectors respectively. It is managements intention to reverse this percentage by 1980.

- An examination was made of CSC's engineering and financial application packages. In both application areas they have application packages similar in capabilities to the ones BCS is developing in their marketing thrust. CSC applications however, are not integrated and are primarily used for similar clients. Whereas, BCS's applications are integrated, have greater capability and are predominately aimed at larger users. With the acquisition of Profit II by BCS we will expand our market horizon

to include smaller users of the type.contacted by CSC's commercial effort.

- CSC is not currently considered a strong commercial competitor to BCS marketing plan however, they should be watched as they strengthen their marketing effort of the next two years. However, CSC represents a formidable competitor in the federal government arena because of their long association with GSA and other federal agencies.

Warren
W. S. Pyles

WSP/jb
attachment

August 30, 1977

COMPETITIVE PROFILE

Computer Sciences Corporation (CSC)
650 North Sepulveda Boulevard
El Segundo, California 90245
(213) 678-0311

FINANCIAL HIGHLIGHTS:

The financial highlights for CSC for fiscal year ending April 1, 1977 are as follows:

	Fiscal 1977	Fiscal 1976	Increase
Revenues	$234,745,000	$219,910,000	7%
Net Earnings	14,635,000	7,233,000	102%
Working Capital	44,214,000	30,955,000	43%
Stockholder's Equity	37,040,000	22,293,000	66%

REVENUE BREAKDOWN (FY 1977)

Federal Government	64%	(Note 1)
State and Local Government	6%	
Commercial	14%	
International	16%	

Note 1: Of the 64% of CSC's total revenue coming from the Federal government, 19% came from NASA, 16% from GSA and 13% came from the Department of Navy, the remaining 16% was distributed under the other federal agencies.

SERVICE BREAKDOWN (FY 1977)

CSC provides two major categories of service:

Contract Services

INFONET

Contract services are those services performed on a project-by-project basis and include items such as the total management and operation of computer facilities for federal, county and local governments as well as for private

business organizations, the development and integration of computer-communication systems for the Armed Forces, and the design, development and operation of computer software in connection with NASA's space program. These contract services are further sub-divided into three sub-categories and the percent of revenues by theoe categories is indicated below:

System development	50%
Facilities management	19%
Communication Engineering	6%
	75%

INFONET provides a broad range of computer programs available to a large number of users through CSC's network. The service is widely used by both government and industry in such areas as financial planning and control, engineering analysis, statistical analysis and data management. CSC makes this service available through the use of an integrated network using common carrier transmission lines and satelite circuits. The breakdown of revenue for fiscal 1977 between federal government and commercial clients is given below:

Federal government (GSA)	15%
Commercial	10%
	25%

DATA CENTER OPERATION

INFONET operates its network using Univac 1108 equipment into major centers located in Oakbrook, Illinois and El Segundo, California. CSC utilizes eleven Univac 1108's, five each in the above centers and one in a new center open this year in Beltsville, Maryland. CSC has designed its own proprietary operating system, called Computer Science Teleprocessing System (CSTS). In addition, CSC has made IBM capability available through the network by using a combination of 1 IBM 360/195, OS/MVT and "IBIS" which enables the automatic transfer of data between the Univac-oriented system and the IBM hardware.

One recent development in data center operations is the integration of minicomputers into the network to handle distributed computing application. In fiscal 1977, several client applications were installed in which a minicomputer is interfaced with the network. This development affords CSC new opportunities for future expansion of the utility of the network by providing cost-effective

solution to many client applications which have associated with them large data requirements.

COMPLETE FINANCIALS

The complete financials for fiscal 1977 are given below, the prior five years are found in the attachment to this memo.

	YEAR ENDED April 1, 1977
REVENUES:	
Contract Services operations	$176,976,000
INFONET operations	57,769,000
Total revenues	234,745,000
EXPENSES:	
Contract Services operations:	
Costs of services	144,778,000
Operating overhead	10,267,000
Depreciation and amortization	5,129,000
	160,174,000
INFONET operations:	
Cost of services	35,627,000
Operating overhead	3,927,000
Depreciation and amortization	4,508,000
	44,062,000
OPERATING INCOME, BEFORE CORPORATE CHARGES:	
Contract Services operations	16,802,000
INFONET operations	13,707,000
Total	30,509,000
CORPORATE CHARGES:	
Interest expense	3,609,000
General and administrative	5,680,000
	9,289,000

Income before taxes and extraordinary item	21,220,000
TAXES ON INCOME	9,585,000
EARNINGS BEFORE EXTRAORDINARY ITEM	11,635,000
Extraordinary item-reduction of income tax expense resulting from use of prior year's net operating loss	3,000,000
NET EARNINGS	$14,635,000
Net earnings per share of common stock, before extraordinary item	$ .81
Net earnings per share of common stock	$ 1.02

KEY FINANCIAL RATIOS	FY 1977	FY 1976	FY 1975
Current ratio	2.2:1	1.8:1	1.9:1
Return on total assets	9.7%	6.9%	3.7%
Return on equity	39.2%	38.9%	27.9%
Debt/Equity ratio	1.4:1	2.3:1	3.3:1
ROR (before taxes)	9.0%	6.6%	4.1%

GEORGRAPHIC COVERAGE

CSC serves its U.S. customers from 69 offices located throughout the country. The firm also has offices in 28 cities abroad. U.S. revenues are concentrated in the northeastern and southeastern regions due to the large volume of business from the Federal Government.

INFONET in 1977 maintains over 1850 customer accounts.

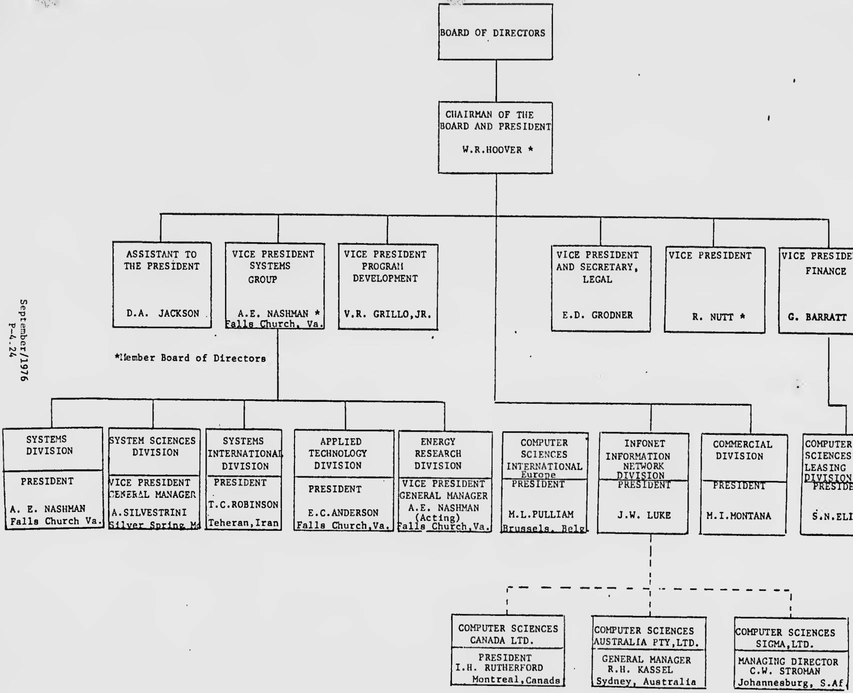
During 1977 total CSC employment was 7,300 people, of which 6,900 operated in the U.S. and 400 internationally.

CSC CONSOLIDATED INCOME STATEMENT

FIVE YEAR SUMMARY

	FISCAL YEAR ($ MILLIONS)				
	1976	1975	1974	1973	1972
Revenues:					
Contract Services operations	$171.417	$139.446	$123.966	$106.079	$100.298
Infonet operations	48.493	37.905	23.012	14.421	—
Total Revenues	219.910	177.351	146.978	120.500	100.298
Expenses:					
Contract Services operations:					
Costs of services	145.346	116,801	98.661	83.304	79.809
Operating overhead	8.916	9.383	10.084	8.507	7.653
Provisions for contract losses and government audit adjustments	—	—	—	5.606	.600
Depreciation and amortization	4.602	4.538	4.380	5.141	5.416
Additional depreciation of computer leasing portfolio	—	—	—	5.988	—
	158.864	130.722	113.125	108.546	93.478
Infonet operations:					
Costs of services	30.624	24.125	16.764	17.022	—
Operating overhead	3.282	2.614	2.340	1.928	—
Depreciation and amortization	3.613	3.284	2.689	2.115	—
	37.519	30.023	21.793	21.065	—
Operating income, before corporate charges and other items:					
Contract Services operations	12.553	8.724	10.841	(2.467)	6.820
Infonet operations	10.974	7.882	1.219	(6.644)	—
	23.527	16.606	12.060	(9.111)	6.820
Corporate charges:					
Interest expense	4.291	5.291	6.092	6.662	2.865
General and administrative	4.777	4.088	3.764	3.418	3.226
	9.068	9.379	9.856	10.080	6.091
Income (loss) from continuing operations before items below	14.459	7.227	2.204	(19.191)	.729
Earnings from sale of Computax Services, Inc.	—	—	—	—	5.517
Costs of proprietary systems previously deferred	—	—	—	—	(62.827)
Income (loss) from continuing operations before taxes	14.459	7.227	2.204	(19.191)	(56.581)
Taxes on income (credit)	7.226	3.582	1.102	(9.677)	(19.251)
Earnings (loss) from continuing operations	7.233	3.645	1.102	(9.514)	37.330
Earnings of subsidiary sold, net of taxes	—	—	—	1.550	1.581
Gain on disposition of subsidiary and sale of investment originating therefrom	—	—	.464	8.100	—
Net earnings (loss)	$ 7.233	$ 3.645	$ 1.566	$ .136	$(35.749)
Average No. Outstanding Shares (total)	14,275,209	14,237,567	14,041,868	13,569,389	13,365,741
Earnings (loss) from continuing operations	$.51	$.26	$.08	$(.70)	$(2.79)
Earnings of subsidiary sold	—	—	—	.11	.12
Gain on disposition of subsidiary and sale of investment originating therefrom	—	—	.03	.60	—
Net earnings (loss)	$.51	$.26	$.11	$.01	$(2.67)

CSC ORGANIZATION CHART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Note: located in Corporate Offices unless designated otherwise.

by Dr. Molly Gleiser

Samuel Morland: from seals to wheels

A nearly forgotten Briton lent his genius to technology and politics

Everyone knows that science and politics are well mixed, even if they don't form a solution.

Three hundred years ago, when England's first computer scientist, Samuel Morland, pursued his career, his science was blended with more than a dash of politics. In fact, his first invention—a letter opener and copier—was not for research purposes but for espionage.

Morland, born in England in 1625, was a student of languages and the humanities at Cambridge, and in 1649 was elected a fellow of his college. It would have been logical for him to follow in the footsteps of his father, an Anglican minister, but he felt that he was unsuited to the ministry and turned instead to mathematics.

He had a special interest in computation and the arrangement of numbers, and in 1650 he published a *Perpetual Almanack* on a single sheet. It is occasionally found engraved on antique snuff boxes or sundials. But he never took part in the mathematical duels that were publicly proclaimed across Europe. His main love appears to have been engineering, and he studied and conducted experiments on flying.

A signet honor

Power and riches, though, are rarely attained through science. By the mid-fifties the lure of politics proved too much for him.

Great political changes were taking place in England at this time. Charles had fled to the Continent, England was declared a Commonwealth, and Morland found himself working for Protector Cromwell in the capacity of "Clerk of His Highness's Signet."

He was admitted to the "most intimat Affayrs of state" and his mechanical ingenuity was given full play in the opening, copying, and resealing without detection of letters that passed through the post office. This was no minor position. There were many complaints about the invasion of privacy, and many writers attempted to protect themselves by using code. Morland became as astute at decoding as he was at opening letters.

He was now rich enough to marry an aristocratic French woman, who bore him several children and with whom he lived in great luxury. But though his life was outwardly straightforward, at work he was privy to all sorts of intrigue: Royalists plotting to enthrone Charles II again, and Cromwell's supporters hatching counterplots to entice him to England and murder him. In it all, Morland played the part of a double spy, warning the king of the conspiracy and saving his life.

Charles triumphantly reclaimed his throne after Cromwell's death and rewarded Morland with a knighthood and a life pension of 500 pounds a year from the post office. The pension did not last long. Hearing that the post office might be transferred from Royal hands and his pension lost, Morland sold it for some puny sum to a Sir Arthur Slingsby. He was now forced to consider his engineering more seriously. Charles II was a great patron of the arts and sciences. Royal favor and grants might be obtained through Morland's inventions.

Bonsai garden

In 1617 John Napier had invented a device known as Napier's bones. It was not really a mechanical calculator; it was an arrangement of the multiplication tables written on strips of wood or bone which could be put together in such a way that the desired computation could be made.

Win an HP-21 calculator!

Complete the information on the survey card bound between pages 16 and 17. **Only those cards with completed information will be selected. Only one card per reader, please.** Deadline is July 1, 1976.

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Chicago, IL 60643
(312) 881-2200
Circle No. 296

Telstat Systems, Inc. XDS
150 E. 58th Street
New York, NY 10022
(212) 826-0640
Circle No. 297

Time Sharing Resources, Inc.
777 Northern Blvd.
Great Neck, NY 11022
(516) 487-0101
Circle No. 298

Tymshare, Inc. XDS 940
10340 Bubb Road DEC 10
Cupertino, CA 95014 IBM
(408) 257-6550
Circle No. 299

Uni-Coll
3401 Science Center
Philadelphia, PA 19104
(215) 387-3890
Circle No. 300

United Computing Systems, Inc.
2525 Washington CDC 6000
Kansas City, MO 64108
(816) 221-9700
Circle No. 301

University Computing Co. U1108
7720 Stemmons Freeway IBM
P.O. Box 47911
Dallas, TX 75247
(214) 637-5010
Circle No. 302

USS Engineers & Consultants, Inc.
600 Grant Street
Pittsburg, PA 15230
(412) 433-6515
Circle No. 303

Wang Computer Services
836 North Street
Tewksbury, MA 01876
(617) 851-4111
Circle No. 304

~~**Westinghouse Tele-Computer Sys.**~~
~~2040 Ardmore Blvd.~~
~~Pittsburgh, PA 15221~~
~~(412) 256-7799~~ NO
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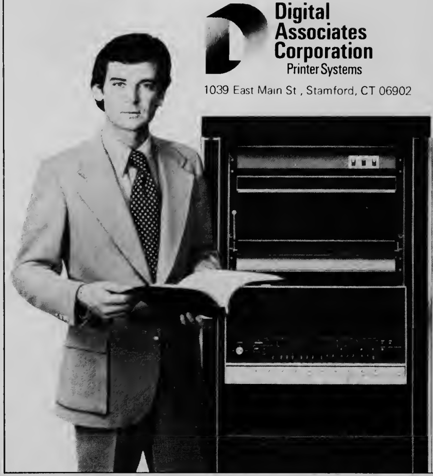

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AUTOMATIC DATA PROCESSING NEWSLETTER

Volume XIX, Number 13, June 23, 1975

Look Who's Using Remote Service

"Timesharing" outgrows its name – and out-grows the computer hardware industry . . . Biggest companies mix remote service with in-house ADP . . . Vendors seek out "most sophisticated" prospects. . . Touch-tone phones access voice-response system.

In the decade or so of its existence, the "timesharing" industry has outgrown that name, with timesharing in the traditional sense (immediate execution of programs or transactions entered in an interactive language at conversational terminals) now exceeded by other remote computing services, primarily remote batch and specialized transaction processing. A spokesman for the Remote Processing Services Section of the Association of Data Processing Service Organizations (Adapso) cities studies putting the total volume of network information services sold by the industry at $893 million in 1974, and notes that slightly less than half of this is for interactive scientific and general business data management services. The rest is remote batch processing or very specialized transaction processing (such as stock price quotation service.)

To Outgrow Hardware

At an estimated growth rate of 25 percent a year, the remote services industry will exceed $1 billion this year and is apparently making inroads into the market of the hardware industry, which is growing at a much slower 7 to 10 percent rate. A spokesman for Grumman Data Systems notes that 60 to 80 percent of the traffic handled by its big Calldata service is remote batch. And McDonnell Douglas Automation Co. (Mcauto), which says that over $100 million a year of its business enters via the telephone system, adds that the majority of this traffic is remote batch. Spokesmen for all of the remote-access services queried by ADPNL for this report were unanimous: nearly all of their business is with companies with large in-house hardware resources and large, sophisticated DP departments. Judging by the frequency with which the Fortune 50 and Fortune 100 were invoked, many of the country's largest corporations are users of remote-access computing services.

Why Are They Doing It?

Why are such users turning to specialized services to handle a significant fraction of their DP traffic? One purpose is to use proprietary applications – ranging from financial analysis programs to such specialized engineering computations as heat flow and stress analysis – where a suitable general package is available and the incremental cost of in-house development is high. Ren Nardoni, a specialist in financial analysis and alternatives for AT&T, and a spokesman for the newly founded Association of Timesharing Users (see box, next page), for example, keeps a terminal in his office with which he accesses "five or six" different commercial services, each with a different financial analysis package he finds useful. But there

NEW TIMESHARING USERS GROUP FORMED

The Association of Timesharing Users, headquartered in New York City, launched as an idea last autumn and incorporated in March 1975, had 600 members by April 2 and over 1,000 now, according to spokesmen. Three quarters of these are from user companies and the rest are "associate members" representing service companies. According to AT&T's Ren Nardoni, one of the founders of the association and president of its New York chapter, 80 percent of the users represented are medium to large corporations -- and most of the members are in functional, end-user departments of their companies, not the DP departments. They span a spectrum from unsophisticated to sophisticated DP users, he said.

Apart from proprietary systems, which Mr. Nardoni says are a major attraction of timesharing services, there is a "great thrust" currently in the direction of generalized facilities -- data-base managers, and systems for data manipulation and report generation controlled by high-level coding in data manipulation languages, with variable report formats and a variety of canned routines available. Such facilities are midway between specific proprietary applications and the completely general facilities of a time-shared operating system and conversational programming language.

Mr. Nardoni uses such facilities even though AT&T has two or three timesharing machines available to him, he said, because they don't offer the flexibility he wants, and he would have to code the data manipulation facilities himself.

Membership interest just now is intense in the area of vendor benchmarking, usage measures and pricing, Mr. Nardoni said. This is a troublesome area, he noted, with each service using a different, complicated billing algorithm based on varying units of connect time, CPU utilization, and storage utilization.

Another area of interest is application swapping between users. The novices among the members, Mr. Nardoni said, look to the association as a learning experience.

Robert Hilton, vice president of the national association, and manager of systems planning for Coca Cola in Atlanta, attributes some of the success of the timesharing industry to the frustration of end users by the lack of user orientation of the traditional DP function. Users wanting to employ computers, he asserted, have often been thwarted by the barriers of technology and poor communication.

By going outside for on-line services, Mr. Hilton said, and keeping large batch applications in house, the user gets the advantage of a big communications network in being, and outside expertise -- "hand-holding" -- in the use of interactive facilities and proprietary applications. By using a service, a customer is sharing hardware, software, and people with other users, he noted.

The on-line environment is a difficult one, Mr. Hilton said: "I see big companies making one costly mistake after another because they don't know what they're dealing with."

Coca Cola, he said, is looking at one system that would cost $22,700 to develop in house, or $2,000 to develop on an outside service. When fully implemented, he said, it would cost $800 a month to operate in house, or $1,000 a month to run on a service.

Looking to the future, Mr. Hilton noted that most systems being developed now within Coca Cola are interactive or on line, not batch. Some of these will be developed on outside services and then brought in, but, he added, he foresees heavy use of outside services for the indefinite future.

are other equally important benefits which large users seek from remote processing services. These fall into several categories, giving rise to service companies with distinct "flavors" -- different hardware, communications organization, and operating environment.

One type of application for which large users turn to remote services are those requiring access to a common data base from multiple locations. This includes order-inquiry and -processing, production and inventory control, distribution management, financial management, and a wide range of industry-specific applications.

Using a remote-access service for this type of application avoids the problem and expense of developing a dedicated communication system -- hardware, software, leased carrier facilities, and in-house expertise -- and offers the economies of a large communication system in being to serve multiple clients of the service.

Mcauto and GE's Mark III service are both active in these application areas. Mcauto is an IMS specialist; according to marketing vice president William Vickroy, the company's center handles over 500,000 IMS transactions a day -- though Mcauto's major business, he says, is remote batch processing, much of it is for production control "in large manufacturing environments."

Mr. Vickroy asserts that his clientele consists of the biggest companies. "Our salesmen look for the most sophisticated users, willing to pay the price to buy our capabilities," he says. Of his IMS customers, he says that they either have too many on-line systems already, or have never used IMS before. (IMS, IBM's big database manager software package, is widely recognized as requiring specific IMS training and experience for successful implementation.)

Some customers, Mr. Vickroy notes, retain Mcauto to design and implement IMS applications which they then transfer to in-house systems, while others leave their systems on the Mcauto network. Handling all communications- and transaction-oriented applications through a service, he adds, keeps a user out of the more complex operating environment, with its operating problems and systems programming requirements, and insulated from the communications technology, which can require in-house communications engineers as well as communications-oriented programmers.

Robert Hench, general manager of the information services technology department of GE's Mark III system, notes some additional communications-oriented applications for which an international system like his is suited: financial consolidation, reducing month-end closing from a typical one to three weeks to a matter of days for a large multinational firm; and worldwide currency management and funds transfer by financial institutions.

GE emphasizes constant availability – "We put a lot of energy into never taking the computer off the air" -- and economies of scale (Mark III operates 120 computers, including minicomputer communications processors) as special features attracting Fortune 500 customers. And, Mr. Hench notes, his operation over a 17-hour span of time zones permits 24-hour load-leveling, with considerable economies.

A very different class of application, requiring a different operating system environment and a different type of communication network, is program development -- particularly when this is done conversationally, by programmers working at terminals. This requires interactive processing, a major new operating burden in a hitherto batch shop. Even when program development is handled conventionally, the unscheduled submissions by programmers requiring fast turnaround -- especially in a debugging phase -- can be a disruption in a production-oriented corporate center.

Curt De Forest, in charge of marketing Grumman Data System's Calldata service, insists that program development is "the sleeper of the industry" and he wants Calldata to be a programmer's system. Grumman, he said, is installing every programmer aid on the market -- debugging aids, short-form Cobol precompilers, etc.

Calldata's IBM complement includes a Model 67 for conversational processing and a Model 75 for remote batch. (Calldata also includes a Honeywell 635, CDC Cyber 73, and a DECsystem-10, all large mainframes, and Mr. De Forest says more are planned, in a push to become a hardware-independent "computer utility.") Fast-response batch, as required in program development, accounts for 60 to 80 percent of Calldata's business, Mr. De Forest notes. "Our value added is fast response and good technical support," he asserts.

Boeing Computer Services, like Grumman Data Systems a profit-center subsidiary of an aircraft company, also resembles it in operating an IBM Model 67 -- the System/360 model specifically designed for time-shared, conversational computing applications. The company operates an IBM Model 168 with TSO (IBM's timesharing option under OS) for more structured transactions, such as data-base accesses.

Boeing's Richard Pavely raises another program development issue -- the commitment to new system resources. Customers, he said, can try out large applications, such as IMS, on a remote service computer without capital cost and with the help of technical consulting and training services. Like Grumman's Mr. De Forest, Mr. Pavely emphasizes technical help for the customer breaking new ground with communications- or transaction-oriented processing.

With a large communications network in being, Boeing also serves large users needing access to a common data base or application from widespread locations, Mr. Pavely said.

Connecticut-based National CSS, Inc., is another of the larger companies specializing in the more complex forms of transaction-oriented processing and in conversational program development. Many customers, said National CSS vice president Richard Bayles, are doing only the most straightforward batch processing in-house, turning to outside services for anything requiring systems sophistication.

Other users, he added, will keep a transaction-oriented application in-house where the transaction is simple and highly structured, and many terminals can be multidropped on a single leased line in a polling environment, making for a simple system. National CSS tends to pick up the applications which become more complex, requiring intelligence in the network management or system monitor, he said.

Users who haven't specialized in interactive systems often have difficulty achieving the necessary performance levels and software functions in house, he said. They aren't willing to dedicate the required resources to TSO or VM (IBM's time-shared virtual machine system). For such reasons, he noted, a user needing a small conversational system – say, ten terminals – is likely to keep it in house, whereas one needing 100 terminals may retain a service.

Other users, Mr. Bayles added, put "discretionary" applications on National CSS computers -- variable-cost computing which can be cut back in recessionary times. On the other hand, he noted, there are customers who move more work to the remote service in recessionary times to avoid adding in-house staff or resources.

Among the mainframe vendors, Honeywell offers Datanetwork service, headquartered in Minneapolis, and Control Data operates its own Cybernet System and the facilities of Service Bureau Corp., acquired from IBM in 1973.

Cybernet offers batch and conversational programming under CDC's Scope and Kronos operating systems. It is particularly oriented to handling the occasional, very large application program, required by some scientific and engineering users, and offers a large library of proprietary scientific and engineering programs.

A spokesman for SBC was one of those to invoke the Fortune list: over 200 of the Fortune 500 use SBC's

t 50 cents each. Quantity reprints are available at quoted prices.

service, he asserted, the bulk of them clients of Mini-Mis II, which he described as a simplified data-base manager system capable of getting a new application up and running very fast.

One large airline, he said, implemented a fuel-tracking system on Mini-Mis when the fuel crisis struck in October 1973 – and the system was operational in one week. Over 150 insurance companies retain SBC, he said, with much of their usage in Mini-Mis.

The spokesman cited a new "co-existence approach" to service marketing at SBC. "We no longer talk about meeting all your DP needs," he said. (He was the only spokesman to cite the DP manager as the "natural adversary" of the remote-access service.)

He put the growth rate of the industry at 30 percent per year or more, higher than most other estimates supplied to ADPNL. It will see twice the percentage growth rate of the hardware industry through 1979, he asserted.

Honeywell's Datanetwork is unique in that it is frankly oriented to marketing support of Honeywell hardware and software, rather than to profit performance in its own right. George Brennan, manager of marketing for Datanetwork, sees "a real swing from time-sharing (i.e., conversational computing) to network information service." The market for scientific problem-solving and other such time-sharing is growing, he said, but not as fast as general business applications, on-line data base, and financial applications.

In the last year, he said, his business has shifted from a 60-40 balance of time-sharing over remote batch to 40-60, with much of the remaining time-sharing a preliminary to batch processing.

He cited companies wanting to cut cash flow by speeding up financial data. "We collect the data all day long, store it, and then batch process it at night," he said.

"We like to deal with the DP manager," he said. "He's more comfortable with us; we're not a separate profit center." He noted that the same Honeywell salesman represents the company's hardware and Datanetwork service.

The industry, according to Richard Crandall, president of the Remote Computing Services Section of Adapso, and president of Com-Share, a service company headquartered in Ann Arbor, Michigan, is seeing a trend to sharp differentiation of services. He sees at least three categories: general-purpose, hardware-vendor-compatible services (almost a commodity, he says); those offering specialized applications and the services of specialized technical personnel; and services with international communications for multinational operations.

Of the specialized companies, he identified two types: the discipline-oriented (financial management, engineering, production control) and the industry-oriented (special services to banks, insurance companies, railroads).

N. Y. Bank Tests Remote Check Guarantee Service for Non-Depositors

The First National City Bank of New York is field testing "Citicard II," an offshoot of its Citicard electronic check guaranteeing system, according to press reports last week.

Queried in New York, the bank confirmed the report, noting that the test is confined to supermarkets in suburban Nassau County. Citicard II is the same type of machine-readable plastic card as a Citicard, but is marketed to consumers who are not depositors in FNCB. On the basis of an initial credit check when a consumer applies for the card, he is assigned a dollar limit which the Citicard computer system will automatically approve (and FNCB will guarantee).

(The Citicard system uses terminals on merchants' premises. When a cardholder makes a purchase, the terminal reads his card and identifies him through a phone link to a central computer. The merchant keys in the amount of the check he is accepting, and the money is held until the cleck clears.)

The Citicard and its terminal use a proprietary encoding and reading technology which the bank has not disclosed, even to apply for a patent. Compared to the conventional magnetic-stripe credit card encoding, the spokesman asserted, the Citicard technology makes it necessary to destroy the card in order to decipher the encoded data, and permits a terminal with very few moving parts, with significant gains in maintenance. The system was developed by Transaction Technology, Los Angeles, a subsidiary of the bank.

Touch-Tone Phone Accesses Computer Directly, Gets Voice Response

A voice-response remote-access computer system is the first entry into the commercial ADP market of McDonnell Douglas Electronics Co., St. Charles, Mo. Called Mavis, the new system is a central-site hardware unit, accessed by a dial-up call from any touch-tone telephone.

The phone itself is the terminal; no other equipment is required at the remote calling site. Mavis includes software for its internal processor and for the host computer to which it is attached. Compatibility is "primarily" with IBM mainframes, a spokesman said.

The system uses a compression algorithm for stored speech claimed to require a tenth to a hundredth of the storage space normally required for digitized speech. The spokesman noted that marketing is end-user oriented, and that two commercial installations are operating currently on a test basis.

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COMPETITIVE ENVIRONMENT

SMALL COMPUTERS ARE BIG COMPETITION

As shown in Exhibit 34, minis and small business systems (SBS) are ranked second only to other EDP Service Firms as the main source of competition to respondent vendors. Running very closely in third and fourth positions are banks and corporations with in-house computers. There is little change from last year, when in-house systems ranked fourth, as minis and SBS were not separately defined, and, as seen this year, have comparable overall frequencies of mention. The small computer competes with batch services and NIS at the low end of the customer range, where average monthly expenditures are under $1000 per month. In-house computers with remote batch and time sharing capability are called Dedicated Information Systems (DIS) and compete for high dollar budgets with NIS vendors. The high level of corporate DIS will not only remove many large customers from the NIS market place, but will also increase competition in the commercial market as DIS owners sell NIS services to other companies.

NIS COMPETITIVE ENVIRONMENT

Competitors Fall into Five Basic Groups

There are five major groupings of competitors in the NIS marketplace, as shown in Exhibit 35:

- Independent NIS vendors
- Computer Manufacturers
- Corporate spinoffs
- Government agencies
- Batch service bureaus

Independent vendors are the largest and most complex competitive group, consisting of four subgroups:

- Dedicated computer service vendors
- Banks which provide computer services
- Spinoffs who have achieved independent status
- Other vendors including CPA firms and common carrier subsidiaries.

Independent NIS vendors define their major competition as other NIS vendors, computers, and banks, in that order.

EXHIBIT 34

RANKING OF COMPETITION

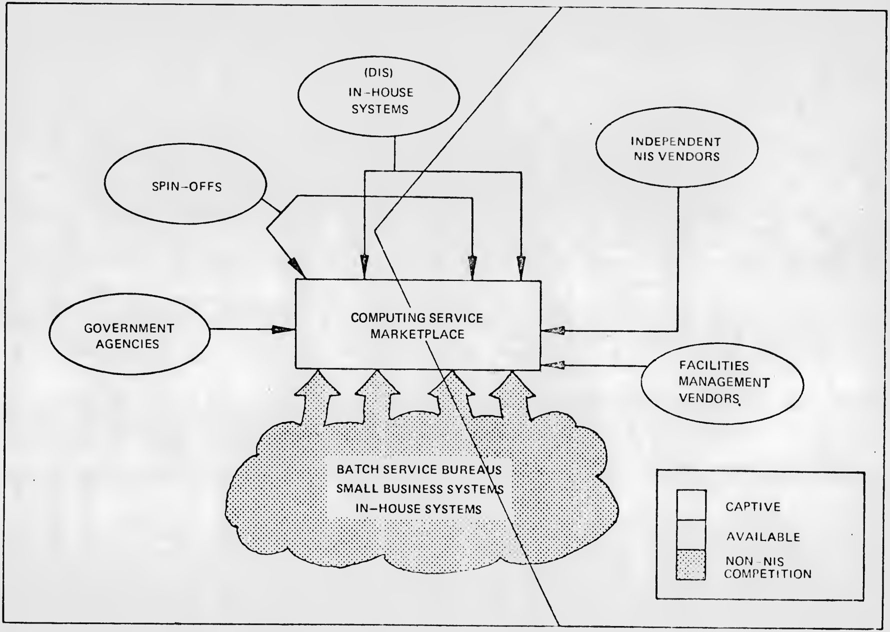
Source of Competition	Number of Times Mentioned						Not Ranked	Total Mentioned	Percent of Total Mentions		Rank Order	
	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6			1974	1973	1974	1973
Other EDP Service Firms	67	31	18	1	0	0	4	121	26.4	25.3	1	1
Minis and Small[1] Business Systems	18	31	22	10	3	1	2	87	19.0	-	2	-
Banks	6	23	33	18	6	0	0	86	18.7	17.9	3	3
Corporations With In-House Computers	18	18	15	35	2	1	2	91	19.8	21.1	4	2
Government Agencies	0	6	4	8	36	1	2	57	12.4	7.1	5	5
Others	7	1	3	3	0	2	1	17	3.7	28.6[2]	6	4
TOTAL	116	110	95	75	47	5	11	459	100%	100%	-	-

[1] Not included in 1974 survey.

[2] Includes universities, insurance companies, other EDP users, and all other sources of competition.

EXHIBIT 35

COMPETITIVE ENVIRONMENT



Available Share of NIS Market Declining

As a consequence of the increased availability of timesharing capability on DIS systems, the competitive posture of large banks in the services industry, and the propensity of large firms (notably large aerospace firms such as Boeing, McDonnel Douglas, Martin Marietta, Grumman, and Rockwell International) to spin-off large EDP departments into the commercial marketplace while retaining the parent company's EDP activity as a subsidy, a decreasing share of the NIS marketplace is available to independent NIS vendors. The available NIS market share will shrink from over 95% in 1974 to about 70% in 1980. In spite of this decreasing share, the available NIS marketplace remains vigorous, and is growing at an average rate of 18% per year.

It is notable that there is currently no giant NIS leader with a position comparable to that of IBM in the EDP equipment sector. GEIS and CDC/SBC are the only two firms with NIS revenues exceeding $50 million and market share of over 5%.

Twenty-Four NIS Vendors Control over 60% of the Market

Of the total $894 million in available NIS revenues, $652 million (72.9%) accrued to 24 vendors, each having NIS revenues in excess of $5 million during 1974. Most of these major companies offer other services in addition to NIS.

Total revenues of this group of 24 companies increased 14% during 1974. Smaller, independent NIS companies performed much better, however. A group of 9 well-known NIS companies, with 1974 annual revenues totalling $139 million, experienced a 36.2% revenue increase over 1973, as shown in Exhibit 36. These data confirm the fact that the national economic malaise in 1974 did not seriously impact the NIS industry as a whole.

Minicomputer Manufacturers and Systems Companies Compete for Small Businesses

The minicomputer manufacturers represent strong competition to NIS services for small business ($5 million - $50 million a year) gross sales). Many of the same points for choosing NIS over an in-house, mid-sized computer apply equally well to the acquisition of an in-house minicomputer business system such as Basic Four, Qantel, DEC, General Automation, Data General, or even Wang. These points are:

- Few or no site preparation costs or air conditioning
- Minimal operating personnel and training required

EXHIBIT 36

REVENUES OF SELECTED NIS VENDORS

($ Millions)

	1974	1973	Change (%)
Compu-Serv Network, Inc.	$ 7	$ 4	+75.0%
Com-Share, Inc.	10	9	+11.1
Cyphernetics	14	9	+55.6
International Timesharing Corp.	6	4	+50.0
Keydata	12	10	+20.0
NCSS	33	23	+43.5
On-Line Systems	12	9	+33.3
Rapidata	12	10	+20.0
Tymshare (Without UDC)	33	24	+37.5
TOTAL	$139	$102	+36.2%

- No operating systems programmers required
- No data processing manager required
- Availability of many software packages at low cost.

It is important to note that a minicomputer is not a small business system until it has been embellished with peripheral equipment and a complete software package. Thus, many minicomputer manufacturers are not competitors in the NIS marketplace, but sell their equipment on an OEM basis to small computer systems companies who package the equipment and software into a small business system.

Banks Are Competitors as well as Customers

Many banks are reluctant to place their operating data and customer records on external computers. Privacy is becoming a growing concern due to increasing consumer awareness and legislation. In addition, spinning-off EDP operations to offer services commercially, particularly to other banks, provides banks with a lucrative source of revenues. Over 250 commercial banks in the U.S. now offer correspondent data services for other banks. Their customers typically are smaller banks, with assets under $100 million, which have not yet installed their own computers; in fact, in 1974, 75% of the banks using off-site computers obtained services from correspondent banks.

Some larger banks, such as State Street Bank in Boston, and First National City Bank of New York, have subcontracted some of their customer payroll services to ADP. Such a combination provides extremely strong competition to another vendor.

Multi-Service Vendors (MSVs): Industry/Application are Key

Success is a function of providing solutions to problems, and often puts the vendor into a position of being able to - or needing to - provide more than one kind of service, e.g., batch and/or NIS. Such capability is characteristic of an MSV.

An MSV provides at least two kinds of data services, and may provide one ore more support services. An example is Computer Sciences Corporation (CSC), which is a major FM vendor, a supplier of software services, and an NIS vendor. It also offers software products and batch services, and approximately 8% of total revenues are derived from third-party leasing.

In order to become a specialized industry vendor, it may be necessary to acquire, license or otherwise enter into a joint venture with a company already having expertise in the area

Boeing Acquires MSV Skills

One example of an aggressively expanding NIS vendor is Boeing Computer Services (BCS), a spin-off of Boeing Aircraft:

- BCS has acquired Leader Corp., New Mexico, a company specializing in EDP for banks;
- BCS and First Commerce Corp., a bank holding company in New Orleans, set up a joint venture, First Boeing Data Services, to specialize in the provision of services to banks and other financial institutions;
- BCS signed an exclusive licensing agreement with Base, Inc., New York, to offer their information retrieval and text editing system, CONTEXT, via the BCS network;
- BCS acquired ownership of SCS Data Processing of Anchorage, Alaska, the leading computer services company in that state, to provide scientific and commercial consulting, systems design, programming, and processing, in addition to BCS' full range of products and services.

CDC: Another Leading MSV

CDC is another major MSV in the NIS business, as a result of internal development and by virtue of its 1973 acquisition of Service Bureau Corp. (SBC); the acquisition almost doubled revenues and filled out CDC's line of services. CDC's CYBERNET System, concentrating on large data base and scientific computer users, can provide both interactive timesharing and remote batch processing services to large users. This system was augmented by SBC's services to the small batch business user, and the CALL/370 NIS for small data base users.

IBM May Be a Major Data Services NIS Vendor in 1980

In 1973 IBM was forced to settle its suit with CDC. Relinquishing SBC to CDC was the least painful spin-off it could make in the settlement. IBM did not focus corporate strength on expanding SBC, partly because of the restrictions of the 1956 Consent Decree and partly because SBC had low priority within the IBM corporate structure. However, IBM has not abandoned the services business completely even though it lost SBC and agreed not to compete in the U.S. data services market for six years. It is specifically excluded from providing batch or NIS processing services until 1979, at which time IBM is free to choose to return to the NIS arena.

In Europe, IBM is actively expanding its computer services activities and is in the process of building a major NIS network. The company still owns SBC Canada and SBC International which allows it, in non-U.S. markets, to follow the current trend in marketing computer equipment and offer not only data processing hardware but coordinated applications support and guidance.

Small Business Systems as a Tool

The market for small business systems, sales of which will exceed $2 billion annually by 1980, represents a relatively stable revenue opportunity. These systems tend to be purchased and have an average useful lifespan of well over seven years. The best NIS vendor strategy is to combine the sales of SBS with NIS. NIS vendors supplying small business systems in addition to, or in conjunction with NIS, can expect greatest penetration of the small user market. Supplying small business systems can also be used as a tool to gain account control over both large and small end user EDP expenditures.

Expenditures for small business systems are growing at 25% annually from a 1973 base of $1.2 billion. All industry sectors are increasing expenditures at more than 20% per year. Major opportunities exist in the Wholesale Distribution, Insurance, Retail Distribution, and Education industry sectors. The growth is due to the availability of low cost systems which solve data processing application problems.

Other Problems Facing Vendors

While competition from other EDP service firms and computers of all sizes is the major issue identified by respondents to the survey, other problems of a serious nature exist. As shown in Exhibit 37, the second and third ranked problems are "Design and development of a new product" and "Marketing personnel acquisition and retention." The issues of what to sell, and to whom to sell it are universal, and not to be solved in this volume. However, some specific information which highlights the impact of the problem of hiring, training, and deploying marketing personnel is shown in Exhibit 38.

Marketing Is the Key

The most significant difference between the most profitable NIS firms and the least profitable in 1973/1974 was the proportion of personnel allocated to marketing activities (sales and field support included). The most profitable firms had an average of 62% of their personnel involved in marketing, while the least profitable only had 50%. Clearly, marketing is the key to success in the NIS industry, and in all other segments of the services industry, as well because of the high profit leverage inherent in the business.

Clearly, the market for computer services is continuing to enjoy an above average growth, and continuing success is available to those firms with the flexibility and resources to provide solutions to customers who are developing increasing sophistication in the definition of their own problems.

EXHIBIT 37

MOST SIGNIFICANT PROBLEMS – RANK ORDER

Problem	Vendor Size, By Annual Revenues				Overall Ranking
	<$½M	$½M-$2M	$2M-$10M	>$10M	
Impact from Service Bureau Competitors and/or New Technology	1	1	2	3	1
Design and Development of a New Product	2	2	1	4	2
Marketing Personnel Acquisition and Retention	5	4	3	2	3
Technical Personnel Acquisition and Retention	4	3	4	1	4
Working Capital and Control of Cash Flow	6	6	6	5	5
Marketing of a New Product	3	5	5	7	6
Government Regulations	7	7	7	6	7
Other	8	8	8	8	8
Total Number of Respondents	36	54	25	11	-

EXHIBIT 38

NIS VENDOR PERSONNEL DISTRIBUTION
BY PROFITABILITY CLASS

	Least Profitable %	Average %	Most Profitable %
Administration	12%	11%	9%
Operations	26	20	18
Development	12	14	11
Marketing	50	55	62
TOTAL	100%	100%	100%

SERVICES INDUSTRY WILL CONTINUE HIGH GROWTH

In spite of the competition from small business systems and minicomputers, with batch service bureaus at the low revenue end of the spectrum, and the withdrawal of several large computer user firms and their statellite clients from the services marketplace, the computer services industry will continue to experience healthy growth during the next five years.

Exhibit 1 shows commercially available computer revenues growing at an average annual growth rate of 14% per year, from a level of $3.3 billion in 1974, to $7.3 billion in 1980. Revenues from the sale of software products will show the most rapid growth, at 26% per year.

EXHIBIT 1

COMPUTER SERVICE MARKET

Type of Service	1974	1980	Growth %/Yr
COMPUTING SERVICES*			
Batch Services	$1,388	$2,080	7
Network Information Services	894	2,408	18
SOFTWARE SUPPORT SERVICES			
Software Products	331	1,351	26
Software Services	473	732	8
SUBTOTAL	$3,086	$6,571	13
EQUIPMENT SUPPORT SERVICES**	238	724	20
TOTAL COMPUTER SERVICES	$3,324	$7,295	14

* Revenues for batch, interactive, remote batch, and software services performed under FM contract are included in respective categories. Separate breakout is shown in Exhibit 1A.

** Equipment Support Services now include Education, System Security and Third Party Maintenance only. Third Party Leasing and Used Computers have been deleted since they simply represent a method of procurement or financing of hardware.

The impact of the recession on planned DP expenditures for 1975 has been slight. The results of a DP user interview program in October, 1974, indicated an average planned budget increase in 1975 of 11.7% over 1974. A new survey of the same respondents in February, 1975, yielded an average budget increase of 10.3%.

EXHIBIT 1A

FACILITIES MANAGEMENT MARKET

Type of Service	1974	1980	Growth %/Yr
FACILITIES MANAGEMENT Available	$753	$1.58B	13
NIS	85	286	24
Batch	473	700	7
Combination	194	592	20

Facilities Management (FM) services generally represent computing services performed under a long-term contract between the supplier and the user. The supplier generally is responsible for software and other aspects of the management of the data processing activity. The FM markets above are included in the computing services markets since they represent a method of contracting rather than a separate type of service at this time.

In addition, this survey reveals average revenues and profits up for vendors in all size categories during 1974, compared with 1973. Forty-four vendors reported an average revenue increase of 24%, and an average net-profit-after-tax increase of 8% for these two years. It appears that DP expenditures are no longer as discretionary as they once were, and that DP is an integral part of the process of doing business.

MULTI-SERVICE VENDORS (MSVs) TO PROVIDE SOLUTIONS

The line between computer services vendors and computer equipment vendors is beginning to blur. By 1980, most users will be buying solutions to problems instead of buying hardware and/or services. In order to deal with the rapidly increasing competition at both the high and low revenue ends of the spectrum, computer services vendors will evolve into Multi-Service Vendors (MSVs), selling solutions to users' problems. This will include, as required, the provision of hardware, software, and facilities management (FM), in addition to the traditional remote computing and batch services currently offered. To the DP user, this will mean a greater opportunity to get the most efficient and most economical solution to his problem with a minimum of comparison studies and installation and integration problems.

Currently, the reduced cost of terminals and communications has brought NIS into effective price competition with batch services. The DP user who is spending less than $1,000 per month for batch services will find he can get a remote batch or interactive NIS terminal and do the same job he is now doing at a batch service bureau without a perceptible increase in cost. By 1980, most terminals will be intelligent, user programmable, and capable of being used either on-line or in a remote batch mode. Batch service bureaus clearly indicate their intention to offer Network Information Services (NIS), particularly remote batch, by 1980.

Minis and Small Business Systems Offer Serious Competition

Second only to the competition from other services vendors, the small computer, typified by the IBM System 32, is the most serious source of competition in the small user market place.

Small business systems and minicomputers will offer the user the opportunity to do a substantial portion of his work in-house, and to connect his system to a larger, more powerful remote computer facility for long term storage, high speed printing, time consuming calculation, or specialized applications, on a pay-as-you-use basis. Service bureaus will shift to a transaction pricing structure, or fixed rate-per-hour structure. This pricing structure

will eliminate one of the most popular reasons expressed by DP users who, disenchanted with unpredictable NIS services costs, prefer to acquire in-house computing capability. Now a user with a simple minicomputer terminal like the NCR 399 or a relatively sophisticated computer like the IBM System 32 can have a base cost for hardware, plus some special services from a remote computing center, for less than $1,000 per month.

In addition, manufacturers of minicomputers and small business systems are selectively addressing specific industries, and providing complete software product packages for those industries. The newly announced IBM System 32 is provided with software packages specifically tailored for construction and wholesale industries, small hospitals, and membership organizations. This is no panacea, however, as the programs are so highly specialized that there is little room for change, and IBM is resistant to making specific customer modifications. As a result, a new software services subindustry is developing, to provide non-standard software programs for System 32 users.

For every dollar spent on equipment for a DP installation, roughly one more dollar is spent on personnel costs. One of the objectives of small business systems vendors and terminal suppliers is to eliminate that second dollar. Thus, in an environment where computer programmers and other DP specialists are becoming scarcer and more expensive, equipment vendors are working toward eliminating the need for such personnel in the small business environment, and reducing the need in larger systems environments. Bundled software, available with intelligent terminals, and increased commitments from service companies toward customer education, training, and installation support combine to make the user's entry into DP less treacherous.

IBM's System 32 leads another thrust into client support by providing auto-instructional programs which teach the naive computer operator how to load and run the system. Everyone's goal seems to be to decrease the labor portion of a user's DP budget. As a consequence of transferring labor into equipment, by 1980 there will be a 10% reduction in the share of DP budgets allocated for personnel, in spite of rapidly increasing salaries and decreasing hardware prices. Small business systems (SBS) users may require no DP staff and no prior DP experience whatsoever. By connecting their SBS to a telephone line, they will be able to access all the resources of a large, well staffed industry specialized computer center.

USERS TO BECOME VENDORS

Users will be buying more specialized services from leading edge DP users having large, in-house computer systems with remote computing capability. The dedicated information systems (DIS) users will appear in all industries, and will market specialized industry applications software, batch services, network information services (NIS), and in some cases, hardware. An example of the latter is the insurance industry, where some companies provide NIS terminals to independent insurance agents.

The concept of a user marketing specialized industry services is not a new one. Large banks have for many years provided correspondent banking services to smaller banks who did not have the resources, or the interest, to develop and install their own data processing centers.

In a fashion similar to that of the banks, large firms will offer general business applications to their customers, in addition to other specialized services. Thus, a small manufacturer of widgets who contracts with a major widget manufacturer for an esoteric manufacturing process control program, available only from that manufacturer, may also have inventory control, accounts receivable, accounts payable, payroll - which may be unique to that industry as a result of a special union contract - and other general business programs and services available to him. Clearly, the questions of security and competitive risk are present, as they are in the banking industry. Nevertheless, the option will still be available.

Those large firms which are most serious about offering services in the commercial marketplace will also offer specialized services, and general business services, to their suppliers and customers. Thus, it will be possible for all parties concerned with some process of converting raw materials into an item sold in a department store to use a terminal to enter data and retrieve information on any relevant portion of that process. For example, many automobile dealers are connected to on-line terminal systems which enable them to locate and request a spare part from the manufacturer's warehouse or any other dealership in the country, and automatically update inventory records.

SERVICE SHIFTING AWAY FROM BATCH PROCESSING TO NIS

Batch services revenues will grow at the slowest rate of all data services, increasing an average of 5% per year, in current dollars. Thus, real growth will be negative. The ready availability of hardware and NIS solutions will seriously impact batch service bureaus. This expectation is clearly reflected by services vendors of all sizes, as seen in Exhibit 2, which reports the results of this survey's question regarding present and planned sources of revenue.

EXHIBIT 2

BATCH PROCESSING AS A PERCENT OF TOTAL REVENUES

	Vendor Size			
	<$500K	$½M-$2M	$2M-$10M	>$10M
1974	79	51	24	18
1977	55	35	16	15
% Change	-30	-32	-36	-13

At the same time, NIS will represent an increasing share of revenues for vendors in all size categories, as shown in Exhibit 3. The largest gain will be in the smallest companies, which are mostly batch oriented today.

EXHIBIT 3

NIS AS A PERCENT OF TOTAL REVENUES

	Vendor Size			
	<$500K	$½M-$2M	$2M-$10M	>$10M
1974	6	15	22	18
1977	20	27	28	24
% Change	+233	+80	+27	+33

By 1980, some $300 million per year in batch service bureau revenues will have been diverted to NIS.

Within the NIS environment there is a clear shift away from traditional time-sharing toward remote batch operations. In 1974, users spent 35% of their remote computing dollars for remote batch, with the balance for on-line inquiry and conversational applications. By 1980 the situation will be dramatically reversed, with 63% of expenditures going toward remote batch.

The migration from batch to remote batch is being encouraged by services vendors. In December, 1974, Tymshare, Inc., a $33 million NIS company, completed the acquisition of United Data Centers, Inc., an $11 million group of batch service bureaus. In 1975, Automatic Data Processing Inc. (ADP), the largest and most successful batch processing firm, specializing in payroll applications and with revenues of $112 million in 1974, announced the acquisition of Cyphernetics Corp., a $14 million NIS firm. Thus, both NIS and batch firms, aware of the trend to remote batch, are moving rapidly to secure the market.

FIVE INDUSTRY SECTORS ACCOUNT FOR OVER 60% OF NIS REVENUES

As shown in Exhibit 4, three major industry sectors account for half of all NIS revenues in 1974 and 1980. These are,

- Finance and Banking
- Discrete Manufacturing
- Process Manufacturing

Issues of federal legislation, privacy and security will impact heavily upon the actual rate of growth of available NIS revenues in the Finance and Banking sector.

Finance and Banking Is Largest NIS User and Third Fastest Growing

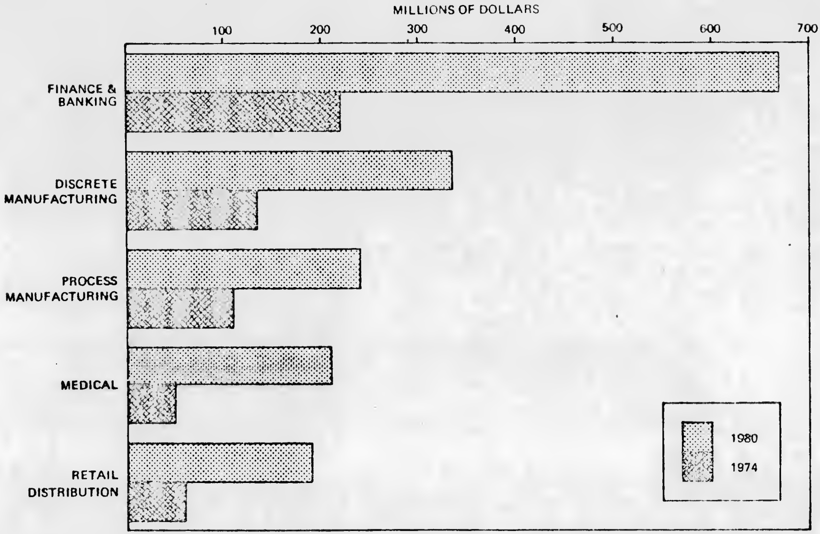
The Finance and Banking sector is the largest user of NIS in 1974, and will continue to be the largest user throughout the forecast period. This industry has the third fastest growth rate, going from $218 million in 1974 to $670 million in 1980, representing a compound annual growth rate of nearly 21%.

The biggest spur to NIS in this industry will be the implementation of Electronic Funds Transfer System (EFTS). Banks will play an increasingly important role in this environment, capturing some $400 million of NIS revenues by providing services to other banks, or by setting up and managing cooperative ventures. Savings and loan associations (S&Ls) are already expanding their "branches" into supermarkets. Eventually, these networks will tie in with retail operations, and include POS terminals and systems.

In all phases of EFTS there are legal problems which must be sorted and solved before an extensive system can be implemented. The biggest problem area is that of anti-trust. The Justice Department has already objected to a Switching and Processing Center (SPC) jointly owned by user banks.

EXHIBIT 4

MAJOR INDUSTRY USERS OF NIS



In March, 1974, a 26-man federal commission was established to study, investigate, and recommend legislative action in connection with the possible development of public or private EFTS. Currently, EFTS moratorium bills are being debated in Congress to stop further development and implementation of EFTS until the details of standardization, legality, privacy and security can be worked out. Nevertheless, the Treasury Department is implementing an EFTS program for payment of Social Security benefits, which will be operational in 1976.

Excellent opportunities for vendors in the short run lie in supporting banks and S&Ls in their struggles to establish local and regional networks, by providing expert consulting in networks, switching systems, and programming.

Very Large Discrete Manufacturing Firms Spend Most for NIS

Discrete manufacturing is a complex industry, comprising 6 major subsectors. The 343 very large firms, with annual revenues in excess of $150 billion, represent less than 0.2% of the total number of firms in this industry, and accounted for 54% of the $137 million spent for NIS in 1974. By 1980, their share will be reduced to 49%, as small and medium firms increase their utilization of NIS.

Currently, 56% of NIS revenues in discrete manufacturing are derived from conversational mode usage. By 1980, consistent with the overall trend, this will reduce to 27%, with remote batch having risen from 36% currently to 66%. This shift will largely result from new users of EDP entering the NIS marketplace. The number of users will increase from 4,000 in 1974 to 12,000 in 1980, drawing mostly from small and medium firms. This influx of smaller firms will cause the use of general business applications to increase from 34% of 1974 revenues to 44% in 1980.

Within the industry subsectors, apparel is the fastest growing, at an average of over 30% per year. Transportation equipment, which is the largest NIS user, will experience a relatively slow average growth rate of about 9% per year.

Process Manufacturing Revenues Dominated by Very Large Firms

Process manufacturing, like discrete manufacturing, is a complex industry, comprised of many subsectors. Of the nearly 66,000 firms, 272 of them (0.4%) account for 40% of NIS revenues. The food and tobacco subsector is the largest NIS submarket, both in terms of dollars expended, and in terms of growth. In contrast, the petroleum subsector is the smallest NIS market in both expenditures and rate of growth. Petroleum companies tend to do nearly all of their data processing in-house, and use outside

services mainly for specialized applications which are not worth developing in-house, and which do not pose any threat to the proprietary nature of their business.

General business applications and scientific computation each generate about one-third of the revenues. Major growth applications will be in point of delivery services, such as at unattended retail and wholesale distribution centers, remote job entry (RJE) for remote plants, and raw time sales to support peak period computation needs.

Medical Industry Revenues Are Fastest Growing

The medical industry, starting from a relatively small base of $56 million in 1974, representing just over 6% of total NIS revenues, will be growing at 24.9% per year, the most rapid of all industry sectors. The hospital subsector is the primary source of revenues, accounting for 93% of the total in 1974, and 87% in 1980, as shown in Exhibit 5. The hospital industry is dominated by four NIS firms: McAuto, Shared Medical Systems, American Hospital Supply Corp., and Health Services Management, each with over 100 U.S. hospitals being serviced. The primary applications relate to patient accounting.

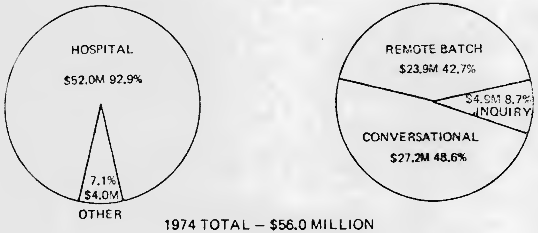
New opportunities in the medical industry will result from National Health Insurance legislation, probably in 1976. The major applications will involve data base management. However, some feel that this area will be the major test of privacy legislation, as individual medical records become accessible on public networks. This could result in some regulation of vendors involved with access and maintenance of the data.

Currently, a smaller scale opportunity exists in program development and regional data base management for Health Maintenance Organizations (HMOs) and Foundations for Medical Care (FMCs), which are health delivery systems being encouraged by the federal government to reduce the cost of medical care. By 1980, the option of joining an HMO will be available to 90% of the U.S. population, and 25% of the population is expected to belong to HMOs by 1984, compared with less than 2% membership today.

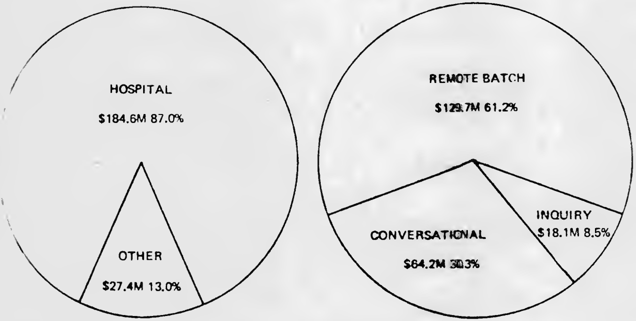
Exhibit 5 also shows that as in other industries, remote batch operations will account for over 60% of the sector's NIS revenues in 1980.

EXHIBIT 5

MEDICAL INDUSTRY AVAILABLE NIS REVENUES



1974 TOTAL – $56.0 MILLION



1980 TOTAL – $212.0 MILLION

Research Department

Wertheim

Industry
Commentary

David R. Caplan

December 31, 1976

COMPUTER SERVICE INDUSTRY REVIEW

An in-depth analysis of the computer service industry was presented in our basic report entitled "Computer Service Industry Outlook: 1974-1980," published last February. The factors which led us to project revenue growth of 18% per year remain valid; the developments affecting near-term prospects are discussed in this industry update. The February report will be referred to on several occasions in order to avoid repetition of fundamental data.

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Summary

The stocks of the larger computer service companies continue to offer attractive short- and long-term investment opportunities. This conclusion is based on the prevailing fundamental forces which provide cost savings and the availability of complete problem-solving capabilities by data processing service companies. Automatic Data and Tymshare remain on our Recommended List, with Computer Sciences and Electronic Data Systems also considered attractive.

Over the near term, the following factors appear favorable:

- A continuation of the 18% revenue trend plus widening margins should lead to strong earnings gains again in 1977;
- Attractive price-earnings multiples in relation to the general market;
- A continuing strengthening of financial position with no requirements for additional outside financing; and
- A small dependency on foreign operations with minor swings in earnings due to currency adjustments.

On a longer term basis, the following items enhance growth prospects of the major companies:

- The economic advantages of using an external computer service;
- The continuing price-performance improvements in hardware alternatives which significantly increase the potential market;
- The prospect of an unbundling of software together with the improbability of IBM's entry into the computer services business;
- The role of the communications common carrier and value added network (VAN) companies; and
- The importance of size of the computer service suppliers.

Overall, the factors which led us to conclude that the prospects for the industry were excellent remain the same today.

Long-Term Growth Factors

On the issue of the economic advantages of data services, we continue to cite three principal tangible cost advantages: (1) the sharing of a portion of more comprehensive computing facilities, rather than the use of a smaller, dedicated processing system; (2) the use of a portion of a fully-utilized, geographically deployed, high-capacity communications system rather than the design and operation of a dedicated, much lower-capacity network; and (3) the availability of complex, general-purpose software packages, the cost of which is distributed over a multiplicity of users, plus access to data bases that would otherwise not be justified for a single-source use.

Each of these items provides a quantifiable cost justification for data processing services; when used in tandem, multiple cost savings can be obtained over an internal installation.*

The arguments for hardware alternatives remain as controversial today as they were a year ago. Questions are still raised about minicomputers and other hardware alternatives displacing data processing services.** There is little evidence to date, other than in small batch processing installations, that the advances in technology and systems design of the past year have resulted in any loss of business to the service companies. To the contrary, it seems that minicomputers and other hardware and software developments together with improvements in data communication networks have been an important factor behind the high rate of growth of the entire data processing market - and an even faster growth for computer services.

Minicomputers have made possible the development of economical data communications networks. Lower costs for hardware have made the use of standard program products feasible while more sophisticated software operating systems have reduced the cost of interfacing between the users and the computer. As a result of this evolution, all participating sectors, including mainframe, minicomputer and service companies alike, have benefitted. We continue to believe that further technological advances in price-performance should sustain the pattern of growth, not restrain it as some would contend.

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* There are a number of other important factors which should increase demand for data processing services, including the ability to:

- Handle complex or specialized problems;
- Use a geographically deployed communications network;
- Maintain a variable cost structure;
- Eliminate peaks and valleys;
- Avoid installation and personnel problems; and
- Have easier site maintenance, operation and security.

For further discussion of these points, see February report pages 12-14.

** See Investment Recommendation--Digital Equipment, dated December 1976, for an analysis of the convergence of the mainframe, minicomputer and microprocessor markets, and the growing competitiveness of software as hardware technology becomes less proprietary.

As IBM and the other mainframe manufacturers have continued to develop new equipment and thereby to expand the base of computer users, the need for outside data processing services has risen. While the introduction of small computing systems will enable some users to transfer their workload to an internal base at the expense of some of the external batch processors, the transfer of this limited amount of business is more than offset by the expanded market which is developing because of the new applications being created by the hardware manufacturers. There continues to be no evidence that the mainframe manufacturers are even considering the elimination or material alteration of the economy of scale factors which are key to our arguments. (See pages 17 to 27 of the February report.)

Regarding IBM's entry into data processing services, it is premature to speculate whether IBM will re-enter the service business following the 1979 expiration of its exclusionary agreement with Control Data. We continue to believe that IBM will not enter the business. There is no current evidence that IBM is preparing for a direct role, and even if the company were to initiate entry in 1979, it is more than likely that IBM's aggressive marketing would help develop and broaden the market to the advantage of other participants in the service industry.

In a related area, there are indications that initial steps are being taken toward the implementation of IBM's 1969 landmark decision to separately price software. Whereas operating systems programs and some auxiliary packages have been provided free by the mainframe manufacturers, there is a more complete unbundling trend beginning to develop. For example, some software systems have been individually priced by IBM in recent announcements. We believe that this practice will proliferate through the remainder of this hardware generation and will be an established policy by 1980, when the next hardware generation is expected. A new pricing umbrella for the independent service companies would then evolve at the expense of the plug compatible mainframe manufacturers. Users will have to pay the hardware suppliers for much of the systems software they now obtain free from the service companies, whose fees are based on line charges and computer time. Furthermore, those service companies that generate a large amount of their own systems software also will not have to pay for IBM's (or other hardware manufacturers') software.

The communications common-carrier companies will impact the cost of communications and develop the technology for both the end-user and computer service companies alike. The major participants are AT&T and IBM (through its satellite communications affiliate) with the value-added network companies (VANS) increasing in number. An example of progress toward lower-cost communications is the FCC's approval of AT&T's request to establish a high-speed switched digital communications network. This development, clearly aimed at enlivening competition between AT&T and IBM, is

limited to capacity of 50 kilobaud. While we expect AT&T to expand from this narrow base, it is more likely that it will move toward a higher rather than lower bandwidth in order to meet the competition of IBM's satellite venture. During the year, Tymshare as well as other companies have formed subsidiaries to provide network services to take advantage of this developing market opportunity.

We have stressed the importance of size as a necessary ingredient for long-term success. Several companies improved their positions this past year. For a few of the larger companies, such as Tymshare and Automatic Data, acquisitions have been meaningful contributors to growth. These companies have acquired product and customer bases at lower cost and in less time than would have been required for internal development. Even some of the smaller companies have recently embarked on acquisition programs. This trend should expand in 1977. We continue to believe that by 1980, the industry will be much more heavily concentrated and far less fragmented than today.

Revenues and Earnings: 1976-1977

The service sector of the data processing industry enjoys a high degree of customer loyalty; there is therefore a relatively low rate of client turnover, especially for the larger computer service companies. Consequently, there is a strong basis for continuity of revenue and earnings growth, which facilitates yearly estimates. With the prospect of 5% growth in real GNP next year, demand for data processing expenditures should continue to be strong. As a result, computer services companies should sustain revenue growth next year at an 18%-20% annual rate. Table I below shows the revenue gains expected for the four primary computer service companies this year and next.

Table I

Revenue Projections for 1976 and 1977*

Company (Fiscal Year)	Revenues(mil)		% Change
	F1977E	F1976E	1976/77E
Automatic Data Processing (Fol. June)	$ 270	$ 225	20.0%
Tymshare	102	81	26.0
Computer Sciences (Fol. March)	290	250	16.0
Electronic Data Systems (Fol. June)	185	155	19.0

---

* Revenues for companies whose fiscal years end before July are included in 1976 totals.

Earnings growth for each of these companies should exceed revenue gains due to expected margin expansion. Our longer term growth projections for three of the primary service companies remain virtually unchanged; that for EDS has been raised slightly, as set forth in Table III on page 9.

Stock Market Performance

Table II

Stock Price Changes for Computer Service Companies*

	December 28, 1976	February 1975	% Change
S&P Industries	118.80	103.53	15%
Automatic Data Processing	29	28	4%
Tymshare	19 Bid	19 Bid	-
Computer Sciences Corp.	7	4	75
Electronic Data Systems	17	12	42
Bradford National	9	8	13
National CSS	23	14	64
National Data Corp.	5 Bid	5 Bid	-
Planning Research Corp.	4	3	33
Shared Medical Systems	27 Bid	20**Bid	35
Applied Data Research Inc.	5	2	150
Comshare Inc.	5 Bid	2 Bid	150
Keydata Corp.	2 Bid	.3 Bid	(33)
On-Line Systems Inc.	22	16	38
Rapidata Inc.	2 Bid	4 Bid	(50)

* Brief comments on each of these companies begin on page 21.
** Initial offering price on June 1976.

Of the primary stocks, Computer Sciences and EDS have clearly shown the greatest appreciation in stock price. Tymshare had advanced to a high of 27 7/8, but what we believe to be a combination of disclosure mishandling and other non-recurring factors, described in detail on page 23, contributed to the stock's decline to present level. Although we have reduced our 1977 earnings estimate from $2.30 to $2.15 per share to reflect the possibility that the current price of the stock could restrict acquisitions, we still regard Tymshare as particularly undervalued.

We judge that Automatic Data's rather flat performance reflects the market's reassessment of many high-multiple stocks. We look for AUD to post earnings gains at an annual rate of 20% over the next four years, which should provide for meaningful long-term capital appreciation.

In the case of Computer Sciences, anticipation of impressive earnings gains (+60% for the fiscal year to end March 1977) and the expectation that the company will continue to do well have contributed to an expansion in the multiple from the exceedingly depressed levels of early 1976. For EDS, the end of a five-year period of flat earnings and the resumption of a strong growth trend, which should begin in the January quarter, are important factors in the multiple expansion. In addition, a yield of 4% and the likelihood of 20% annual dividend increases may have heightened interest in the stock as an income-oriented participation in the group.

The table below presents long-term absolute and relative earnings growth rates compared to the absolute and relative multiples for the S&P.

Table III

Estimated Comparative Growth Rates and Multiples for Major Computer Service Companies

	S&P 400	Automatic Data Processing(1)	Tymshare	Computer Sciences(3)	EDS(1)
Earnings Per Share					
1977	$11.90	$1.85	$2.15	$1.05	$1.60
1976	10.75	1.50	1.55	0.80	1.25
1975A	8.29	1.22	1.21(2)	0.51	1.10
Annual Growth					
1 yr. 1976-77	10.7%	23%	39%	31%	28%
1 yr. 1975-76	29.7	23	28	57	14
Compound Annual Growth					
4 yrs. 1976-80	7%	20%	32%	20%	20%
Recent Price(4)	118.80	29	19bid	7	17
P/E Absolute - 1977 EPS	10x	15.7x	8.8x	7.4x	11.7x
P/E Absolute / 1976-80 CGR	1.4	0.8	0.3	0.4	0.6
P/E Relative - 1977 EPS	-	157%	88%	74%	117%
Relative 1976-80 EPS Growth	-	286%	457%	286%	286%

(1) Fiscal year ends following June 30. Relative and absolute ratios calculated on estimated calendar 1977 earnings of $1.65 for AUD and $1.45 for EDS.
(2) Revised from $1.19 to reflect pooled acquisitions.
(3) Fiscal year ends following March 31. Relative and absolute ratios calculated on estimated calendar 1977 earnings of $0.95.
(4) As of December 28, 1976.

Automatic Data, Tymshare, EDS and Computer Sciences are all projected to outpace the S&P earnings growth over the near and long term. AUD's profits should grow at 286% of the S&P's; Tymshare's should grow faster than AUD at 457% of the S&P. Even allowing for the volatile earnings record of certain companies in this industry, these stocks have not been accorded multiples we would regard as commensurate with this earnings outlook: AUD is selling at 157% of the S&P and Tymshare at 88%.

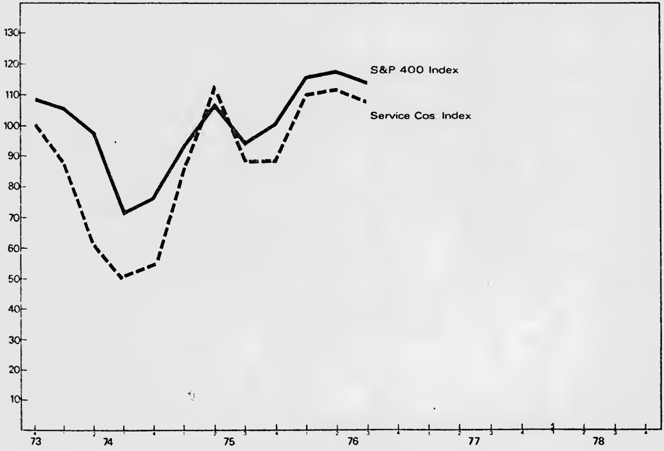
This also holds true for Computer Sciences and EDS, whose relative growth rates are both projected at 286% of the S&P, and whose relative multiples are only 74% and 117%. Furthermore, EDS is yielding 3.5% compared to the 3.4% yield for the S&P.

A multiple expansion for Tymshare, CSC and EDS on top of the strong earnings gains expected over the next 12 months should provide an opportunity for significant capital appreciation.

The chart below depicts our new Computer Services Industry Index, which is composed of the 14 larger service companies and is weighted according to market capitalization. January 1, 1973 is equal to 100.0; the S&P 425 on that date was 109.14.

Table IV

Computer Service Industry Index



S&P 425 Index prior to 7/1/76. Shared Medical Systems Corp included in Service Cos. Index from June 1976.

Statistical Summary

The following section will highlight important selected financial data for the 14 computer service companies which are part of our continuing coverage. Table V shows the historical and projected operating results while Table VI illustrates comparative financial data on the companies' most recently completed fiscal years. Table VII lists selected financial data based on the most recent quarterly published results as well as our expectations for the next to be reported quarter. Each of these tables will be updated as part of our regular Computer Services Industry Review.

Beginning on page 21, we present summaries of the significant developments which have impacted each of the 14 service companies in the past year.

		Earnings Per Share*				
		1975	1976E	1977E	Current Quarter	Yield
Automatic Data Processing, Inc.	(29)	$1.22	$1.50	$1.85	Up	0.8%

* Fully diluted; fiscal year ends following June 30.

Automatic Data's fully-diluted earnings in the year to end June 1977 are estimated to be $1.50 per share, up 23% on a 20% gain in revenues to $225 million. We look for another 23% earnings advance the following year on revenues of $270 million. The company's long-term growth rate appears sustainable at at least 20% per year through 1980, and we continue to recommend purchase of the stock.

Commercial business has continued to show good growth so far this fiscal year; this sector now contributes just under one half of total company revenues. The payroll business is also expanding mostly from the addition of new customers. This area has not yet experienced a volume pickup in line with the post-recession recovery in employment, but this should occur in the next six months. As of the end of September, the customer base has expanded to include 35,000 users in payroll, 3,200 in accounts receivable, 5,000 in general ledger and 1,100 in accounts payable.

Looking ahead to next fiscal year, in the context of good industry growth and a stronger economic environment, a 20% gain in revenues is anticipated. Another modest expansion in margins should bring earnings to $1.85 per share.

Our quarterly estimates are shown below:

Quarterly Estimates

	1976E	1975	% Change
1Q	$0.33A	$0.26	23%
2Q	0.37	0.30	23
3Q	0.36	0.32	13
4Q	0.45	0.35	29
Year	$1.50	$1.22	23%

Since January 1976, the company has completed several acquisitions. These include:

- The brokerage services division of PCS Data Processing Inc., with annual revenues of about $860,000, which provides data processing services to 14 clients in the Philadelphia-Baltimore area;
- The Delos International Group, acquired for just under $7 million. Delos provides computer timesharing services, with principal activities conducted in the United Kingdom and a secondary timesharing facility in Princeton, New Jersey;

- Information Sciences, acquired in April, which provides timesharing services mostly in the Portland, Oregon and Seattle, Washington areas. This company has annual revenues of approximately $500,000;
- Systems SA of Sao Paulo, Brazil, completed in April when AUD acquired 67% of the common stock of the company. Systems SA serves approximately 300 clients in Brazil and has annual revenues of $2.5 million; and
- The CPI Group of Newport Beach, California, which was acquired in November 1976 for 240,015 shares. CPI provides computerized administration, trustee and custodial services for individual accounts (IRA), proprietorships, partnerships (KEOGH), and small corporations through profit sharing plans. For the fiscal year ended in June 1976, CPI had revenues of $3.3 million and net earnings of about $450,000.

For further information, see Follow-Up Reports dated April 28, and September 9, 1976.

	Earnings Per Share				
	1975	1976E	1977E	Current Quarter	Yield
Tymshare (19b)	$1.21	$1.55	$2.15	Up	-

The company's earnings through September were $1.20 versus a restated $0.95 in the similar period a year earlier. For the full year, we estimate earnings at $1.55 per share versus a restated $1.21, a 28% gain. We had previously carried a $1.70 estimate.

The shortfall is primarily due to a modification of Tymshare's pricing policy to allow a discount for use in the non-prime time hours. This price adjustment was prompted by the company's desire to better utilize off-hour capacity. Notwithstanding a customer survey, Tymshare apparently miscalculated the number of customers who would shift their workload. As a result, revenues increased less than anticipated in the third quarter. The migration to off-hours appears to have been substantially completed by September, and the company should benefit over the longer-term as the prime time which became available is utilized.

Further pressure during July and August came from a slowdown in the rate of addition of new customers and a revenue shortfall at the Valcomp division due to customers' deferring commitments to purchase spare parts of doubtful ownership. Since then, and through November, the company's business has shown a more normal growth trend.

For 1977, we expect strong business activity to result in earnings of $2.15 per share. Our previous estimate of $2.30 included $0.15 from acquisitions to be made during the year. Should the stock price fail to recover from the depressed levels of the last few months, the company might temporarily defer completing any acquisitions. We have therefore eliminated the incremental $0.15. The fundamental outlook for the company remains attractive and with the stock particularly undervalued, we continue to recommend its purchase.

Earnings in the fourth quarter of 1976 should advance 35% to $0.35 versus $0.26 last year. Due to a peculiarity in the restatement to include the recently acquired Unitax operation, earnings for the first quarter of 1977 should be only 18% higher, while second-quarter results are projected to be 50% ahead. Unitax's business, tax preparation, is highly seasonal, with nearly all revenues and earnings accruing in the February through April months. The restated results for 1975 and the first half of 1976 combined Tymshare's calendar quarters with Unitax's fiscal quarters (4/30, 7/31, 10/31 and 1/31). Beginning with the fourth quarter of 1976, combined results will be reported on a regular calendar basis, resulting in a shift of one month of high profits (April 1977) from Tymshare's first quarter to its second. The change will also insert one seasonally unprofitable month (January 1977) into Tymshare's first quarter.

Quarterly Breakdowns

	1975*	1976E*	1977E	% Change 1975/76	% Change 1976/77
1Q	$0.46	$0.57A	$0.67	24%	18%
2Q	0.24	0.36A	0.54	50	50
3Q	0.25	0.27A	0.46	8	70
4Q	0.26	0.35	0.46	35	32
Year	$1.21	$1.55	$2.13	28%	38%

* Restated

Tymshare's compound annual growth rate through 1980 is still projected at 30%-35% from both internal growth and acquisitions. The depressed level of the stock is not expected to curtail acquisition plans for more than 6-12 months, since the company does have the financial flexibility to make cash purchases.

Since the beginning of 1976, the following acquisitions have been completed:

- Medical Data Systems, Inc. (MDS), acquired for 82,000 shares of Tymshare stock, was completed on a pooling-of-interest basis in June. MDS provides financial and administrative data processing services in the health care industry to customers located principally in New Jersey, Pennsylvania and New York, with revenues last year of approximately $3 million;
- Unitax was acquired on a pooling-of-interst basis in August for about 144,000 shares of Tymshare stock. Unitax provides computerized income-tax preparation services, principally in California. Revenues were approximately $4 million last year and pretax margins were about 13%; and
- Simplified Data Processing Inc. (SDP) was purchased in October for about 53,000 shares of Tymshare stock. SDP provides on-line services to the fuel industry on Long Island. The company is currently profitable with annual revenues estimated to be about $2 million.

In addition, the following developments were completed on various joint ventures with overseas affiliates:

- The purchase of a 20% interest for about $3 million cash in SLIGOS S.A., a leading French computer service company. SLIGOS provides remote batch services in France similar to the services offered by United Data Centers in the U.S. (acquired by Tymshare 18 months ago). SLIGOS has

annual revenues of about $32 million and has recently reached profitability. In this venture, Credit Lyonnais, the second largest bank in France, is Tymshare's partner.

- Tymshare increased its equity ownership in its French affiliate, CEGOS-Tymshare, from 20% to 45%, for a $1.1 million cash expenditure. At the same time, Credit-Lyonnais, Tymshare's partner in this joint venture also, increased its interest to 51%. CEGOS-Tymshare provides on-line remote data processing services throughout France and in certain other Western European countries under a licensing arrangement with Tymshare. Revenues are approximately $5 million and pretax margins over 15%;
- The company reached an agreement with Taylorix, a jointly owned German company, to provide Tymshare's services in Germany. Taylorix's revenue base is about $40 million. The joint venture will result in Taylorix marketing computerized on-line network services provided by Tymshare. For its 65% equity interest, Tymshare will assume approximately 50% of the debt of this joint venture; and
- Tymshare just announced an agreement to form a jointly owned Japanese corporation with Marubeni Corp. to provide Tymshare's services in Japan. Marubeni accounts for about 12% of the total business volume handled by Japan's ten largest trading companies; 1975 volume exceeded $19 billion. Marubeni will hold the majority ownership (55%) and will provide the management and staff; Tymshare will provide certain sales and technical support.

Note: Wertheim & Co., Inc. usually makes a trading market in the common stock of this company and shares may accordingly be sold to or bought from customers on a principal basis.

For further information, see Follow-Up Reports dated August 2, 1976 and October 6, 7 and 19, 1976.

	Earnings Per Share* 1975	1976E	1977E	Current Quarter	Yield
Computer Sciences (7)	$0.51	$0.80	$1.05	Up	-

* Fiscal years end following March 31.

In the first half of this fiscal year, continuing margin improvement in all sectors of the company's business was reflected in a gain in earnings per share to $0.38 versus $0.23 last year. The slightly better earnings than expected were largely a result of a modestly lower tax rate, which should be sustained at about 43% for the remainder of the fiscal year. As a result, earnings per share are estimated at $0.80, slightly better than our previous $0.75 number. Revenues are projected at $250 million, a gain of nearly 14%.

Revenues rose only 9% in the first half of this fiscal year, with the shortfall due to the failure of the Federal government to spend a portion of the funds appropriated. Infonet, the company's time sharing division, has progressed satisfactorily with revenues rising 18% for the six-month period. For the remainder of the year, we expect contract services to accelerate as the government's deferred spending begins to materialize.

For the year to end March 1978, revenues are projected to climb another 16% to $290 million while margin expansion should enable earnings per share to jump another 31% to $1.05. Although revenue gains for this fiscal year and next are below the projected industry average of 18%, earnings will benefit from the widening of margins from 6.6% in fiscal 1975 to an estimated 9.2% in fiscal 1977.

Quarterly Breakdown

	F1976E	F1975	% Change
1Q	$0.18A	$0.11	64%
2Q	0.20A	0.12	67
3Q	0.21	0.13	62
4Q	0.22	0.15	47
Year	$0.81	$0.51	59%

NOTE: Wertheim & Co., Inc. and/or persons associated with it have a position in the common shares and/or options of this company.

	Earnings Per Share*				
	1975	1976E	1977E	Current Quarter	Yield
Electronic Data Systems(17)	$1.10	$1.25	$1.60	Flat	3.5%

* Fiscal years end following June 30.

In the fiscal year ended June 1976, EDS lost an estimated $22 million in annual revenues from customers who did not renew their data processing contracts. Among the major contracts lost were those for various state health-benefit programs in Texas, Indiana, Pennsylvania, and New York. However, new bookings were especially strong during the year, replacing an estimated $30 million in annualized revenues, $20 million of which accrued during the last fiscal year. Interestingly, some of the business lost last year is now returning. For example, Texas has awarded EDS the entire state Medicaid program, which begins in January 1977.

In the current fiscal year, contracts accounting for about $11 million, or about 7.5% of total company revenues, come up for renewal. It is estimated that approximately $3 million in business could be lost. Based on the strength of new customer interest, however, new bookings for this year are anticipated to amount to $50 million. Of this total, $25 million should accrue during the current year. Therefore, the net revenue increment this year should be approximately $22 million, which would result in revenues for the year ending June 1977 of approximately $155 million. Since the new business will likely have lower margins at first due to the higher startup costs than the health care and other business lost last year, margins could be under pressure temporarily, but should rebound in the second half to average up slightly for the full year. Earnings are estimated at $0.53 for the first six months through December 1976, should see a sharp recovery beginning in the third quarter, and are projected to close the year up 14% to $1.25 versus $1.10.

Quarterly Breakdown

	F1976E	F1975	% Change
1Q	$0.26A	$0.29A	(10%)
2Q	0.27	0.27	--
3Q	0.34	0.26	31
4Q	0.38	0.28	36
Year	$1.25	$1.10	14%

For the fiscal year ending June 1978, we expect earnings to rise 28% to $1.60 per share. With few contracts up for renewal, a 16% revenue gain inherent in the carryover of the prior-year's new contracts and the assumption of $20 million in new bookings taken in during the year, this net income figure seems attainable. The level of new bookings, while reasonable by historical standards, could prove conservative if the recent trend is sustained.

	Earnings Per Share				
	1975	1976E	1977E	Current Quarter	Yield
Bradford National(9)	$1.00	$0.75	$1.00	Down	2.2%

Bradford National's earnings in 1976 seem likely to be closer to $0.75 per share than to the $1.20 we had estimated last February. The acquisition of the Chase Manhattan Bank stock transfer business, which should generate revenues of at least $10 million in 1977 and should be an important contributor to profits, nonetheless penalized Bradford's third-period pretax margins. For the full year, margins are estimated to narrow significantly from 12.6% to 8.0%. About 400 new employees (primarily from the Chase) have been added to handle the workload.

Next year, despite the benefit of the new Chase contract, earnings are estimated to recover to only $1.00 per share on revenues of $85 million. Margins should recover modestly to 9.5%. The company has also acquired a contract worth about $1 million in revenues from New York City to handle the data processing of all parking violations. Further, the stock transfer business from a small bank should generate volume of about $500,000.

Separately, the SEC has still not disclosed whether it will terminate its contract for the national clearing business. Worth more than $7 million in annual revenue, this decision is expected shortly.

	Earnings Per Share*				
	1975	1976E	1977E	Current Quarter	Yield
National CSS(23)	$1.95	$2.80	$2.90	Up	0.9%

* Fiscal years end following February 28.

National CSS's major source of business continues to be terminal-based services, which will comprise approximately 88% of 1976 revenues. The company's two largest customers contribute about 12% of total revenues, while about 37% of volume is derived from the 30 top accounts. The acquisition of new accounts continues at a good rate, and no significant customer losses have occurred this year. About 30% of the timesharing base has been transferred to contracts of one or two years duration, in exchange for varying discounts. For the year ending February 1977, revenues should be about $42 million, a gain of 18% over last year, and earnings per share are estimated at $2.80 up from our previous $2.30 figure. For the following fiscal year, revenues are projected to increase 19% to $50 million and pretax margins should increase slightly to 13.5%. However, the tax rate is likely to be 50% versus 42% in

the current year, due to a transition to a lower investment tax credit. Earnings per share should rise only slightly to $2.90. The ITC benefits amounted to $100,000 last fiscal year, are expected to rise to $635,000 this year, but to decline to $200,000 next year.

The addition of an Amdahl machine has resulted in the company's three largest machines operating at 50% of capacity. The acquisition of new business for these machines would thus provide an opportunity for margin expansion. However, since only 22% of the company's costs are for hardware systems, this improvement will be somewhat modest.

	Earnings Per Share*				
	1975	1976E	1977E	Current Quarter	Yield
National Data (5b)	$0.38	$0.50	N.E.	Up	--

* Fiscal years end following May 31.

National Data has disclosed that a contract to provide credit processing services for Atlantic Richfield has been renewed for another four years through 1980, worth a total of about $40 million in revenues. The Arco experience is in contrast to the general trend in the petroleum industry toward inhouse credit authorization capability. Indeed, National Data has lost about 30% of its revenue base from this source over the past six months.

Since most of the contracts held by the company in this field have now been terminated, the decline in revenue volume should abate. With the prospect for new business from sources outside the petroleum industry encouraging and the maintenance of revenues from other credit authorization and cash management services estimated to continue to grow at about 20% per year, total company revenues for the year to end next May should rise modestly to $36 million from $32.9 million. We had previously looked for revenues of $41 million. Earnings will also probably fall short of our earlier expectation of $0.60 per share, but will not be penalized to the full extent of the revenue drop since the shift in mix of business has been toward higher-profit contracts.

	Earnings Per Share*				
	1975	1976E	1977E	Current Quarter	Yield
Planning Research(4)	$0.50	$0.65	N.E.	Up	--

* Fiscal years end following June 30.

Planning Research's revenue growth is estimated at 8% in the year to end June 1977 to $160 million versus $148 million. Margins should recover to 5.0% after slipping last fiscal year, and earnings per share are estimated at $0.65 versus $0.50. Both our revenue and earnings estimates are slightly higher than carried in our February report. PRC began this fiscal year with $90 million of recurring backlog business and about $50 million of new business. The average contract life is about one year. The company is bidding on several state Medicaid programs in competition with EDS.

Planning Research acquired Consoer, Townsend & Associates (CTA), a nationwide consulting engineering firm, for 500,000 shares of PRC stock plus cash of about $12 million. CTA specializes in water pollution control and has annual revenues of about $20 million.

The three companies sold this year were:

- Foster Associates, which did consulting work in the energy area and provided rate and economic analysis for utilities, was sold for $1.1 million. Revenues were about $4 million and the operation was profitable. Foster was sold for conflict of interest reasons.
- AHF Inc. did market research for commercial companies. Revenues were about $2 million and the company was losing money.
- Berkus did work in the residential and architectural fields. Revenues were about $1.5 million, but Berkus was also losing money.

	Earnings Per Share				
	1975	1976E	1977E	Current Quarter	Yield
Shared Medical Systems(27b)	$1.19	$1.90	$2.25	Up	--

Shared Medical Systems became publicly held last June and has been added to our list of companies followed in the computer services industry. The company provides on-line computer services

to hospitals for the handling of inpatient and outpatient services as well as for general accounting functions. The company offers services in four general areas: 1) patient accounting, 2) general accounting, 3) patient management, and 4) other.

Patient accounting systems provide hospitals with billing and accounts receivable services and prepare bills for both patients and insured payors, such as Blue Cross/Blue Shield. The accounting services offered by SMS provide for prompt preparation of the complex bills and assist the hospital in reducing its level of receivables. In addition, accounting reports for management analysis are generated.

General accounting includes payroll, personnel, accounts payable, general ledger, inventory, and fixed asset management; these systems are designed to facilitate the financial and the administrative operation of the hospital and can be obtained individually or in combination.

Patient management services are used to control admissions, transfers and discharges, and provide other statistical information such as the number of patients served and the length of stay. This information is useful for management analysis as well as for reporting on various government cost-reimbursement programs.

In other services, the company offers in-hospital data collection and communication systems, medical record indexing, physical billing and clinical laboratory reporting. These other services are a small part of total company business.

The company has some contracts with initial terms ranging from 1 to 5 years, but most are of 3 years' duration. The company currently deals with approximately 325 hospitals holding about 90,000 beds. The total industry is projected at 2,800 acute-care hospitals (with a minimum of 100 beds), totalling over 800,000 beds.

Competition comes from McAuto, a division of McDonnell Douglas that is aggressively marketing its own hospital management systems, as well as a few other smaller service companies. IBM may offer soon new hardware and software packages specifically oriented to special industry applications. We expect that IBM will provide formidable competition in the future in highly structured areas such as hospital systems.

Shared Medical has shown dramatic growth from a $3.5 million revenue base in 1971 to $22.6 million at the end of 1975. Margins and profitability have likewise expanded at a rapid rate with earnings moving from a loss of $0.58 to a profit of $1.19. For this year, we estimate revenues in excess of $35 million with earnings of $1.90 per share. Pretax margins are estimated at

27%. While revenue and profit growth could continue strong for at least the next two years, the past rates of growth are not sustainable and the high profit margins currently achieved may come under pressure. Our preliminary assessment for 1977 is that revenues should grow by 21% to $43 million with earnings rising 18% to $2.25 per share.

	Earnings Per Share				
	1975	1976E	1977E	Current Quarter	Yield
Applied Data Research(5)	$0.29	$0.80	$1.05	Up	--

Applied Data Research is one of the largest independent suppliers of computer software, with over 5,000 installed products in the U. S. today. About two-thirds of company revenues, or an estimated $10 million, will come from this source this year, 50% above the $6.5 million of last year. Communications-oriented computer control systems will account for about 18% of revenues, or $2.7 million. Professional services, mostly cost-plus, fixed-fee contract programming and consulting to the Federal Government, make up the remaining 16%.

Software revenues are derived from five packages; the revenue contribution of each for 1976 and 1977 is estimated below:

$ in Millions

	1977	1976
Librarian	$ 5.1	$ 4.7
Metacobol	0.9	0.8
Roscoe	3.7	3.0
Autoflow	1.2	0.7
Look	1.5	0.7
Others	0.1	0.1
Total	$12.5	$10.0

Librarian is a source program management system; Metacobol is a high-performance Cobol compiler. Roscoe is an on-line program development package for use in writing and testing programs; Autoflow is a software documentation package also used for testing and debugging programs. Look is a systems performance measurement package.

Total revenues for 1976 are now expected to reach $15.2 million versus an earlier estimate of $14.5 million. The high profitability of software systems sales should result in earnings being much higher at $0.80 versus our original $0.40 projection made last year.

Since a large portion of the company's revenues represent onetime sales of software, annual earnings growth is difficult to estimate. However, about $3 million of next year's estimated $12.5 million in software revenues will represent recurring volume from previous installations. Communications-oriented computer control systems revenues are projected to rise to $3.5

million next year, while professional services should remain at about $2.5 million. Total revenues are thus estimated at $18.5 million. Because of the high-margined incremental business, earnings per share from continuing operations should advance 31% to $1.05 from the estimated $0.80 for this year.

	Earnings Per Share*				
	1975	1976E	1977E	Current Quarter	Yield
Comshare (5b)	$0.52	$0.85	N.E.	Up	-

* Fiscal years end following June 30.

The company has been directing its efforts towards a greater concentration in specialty areas. In the year ended June 1976, specialty systems comprised 25% of total revenues. The three major sectors include: (1) financial services to accounting firms (25% of specialty dollar volume), (2) personnel administration, a disciplinary service offered over different industry sectors (50%); and (3) telephone administration (25%). Another 60% of last year's business was comprised of data management systems, whereby customers use the company's proprietary software packages; basic timesharing accounted for the remaining 15%.

The company now has close to 700 clients, the largest user making up 5% of estimated fiscal 1976 (June 1977) revenues of $18.0 million. The top five clients will represent about 19% of projected volume and the next 20 about 33%. Foreign revenues, which are not included in consolidated reported results, should amount to an additional $10 million. A reduction in the use of one of the company's services by a large accounting firm resulted in the loss of revenues of about $1.7 million last year. However, this loss of business has been largely replaced, as evidenced by first-quarter revenue increases of 8% to $3.7 million.

Several acquisitions recently completed have high seasonal swings and will result in greater volatility in quarterly earnings than characteristic of the company's past performance.

The two acquisitions recently announced are:

- Systematic Computer Services (SCS), which specializes in the preparation of income tax returns for CPA's primarily in the Mid-west and western states, was acquired for 220,000 shares of Comshare common stock. Revenues are expected to be about $1.4 million this fiscal year. The company should make a positive contribution to earnings, with the largest percentage occurring in the quarter ending March 1977.

- Trilog Associates, which provides computerized employee benefit and pension plan accounting and administrative services, is being acquired for $25,000 shares of common stock. Revenues are estimated to be about $700,000 this year and net income about $40,000.

	Earnings Per Share*				
	1975	1976E	1977E	Current Quarter	Yield
Keydata (2b)	$0.21	$0.10	N.E.	Down	-

* Fiscal years end following July.

In the last six months, the company has seen a sustained increase in orders, with new bookings exceeding quota. Keydata has undergone a thorough turnover in its management structure; since the new president took office in August 1974, the company has replaced and retrained almost its entire sales force. New products have been introduced and the financial structure has improved. However, discontinuances are still running at high levels and are now approximately 15% of the installed base.

We have downgraded our revenue estimate for this fiscal year from $18 million to $14.5 million. A delay in translating new bookings into the revenue stream will hold down first-half revenues. Furthermore, the company is increasing its level of R&D expenditures, which could cause margins to halve from last year's 7.9%, resulting in earnings per share of $0.10 compared to our earlier estimate of $0.30.

	Earnings Per Share*				
	1975	1976E	1977E	Current Quarter	Yield
On-Line Systems (22)	$0.97	$1.50	$1.85	Up	-

* Fiscal years end following April.

On-Line Systems principal business continues to be providing timesharing services to the Federal government and commercial accounts. The company's basic business is data-base management systems with about 35% of estimated total company revenues of

$15.8 million this fiscal year being derived from the government. The company has about 600 customers, about the same as a year ago. The largest user is the Office of Education, which will contribute approximately $4.5 million this year and the same amount next year. The ten next largest customers should account for 25% of revenues this year versus about 33% a year ago.

Over the last year, commercial business has grown at about a 20% annual rate, while government business has expanded more quickly. Margins, however, are slightly higher in the commercial business. Improving usage among the company's smaller customers should result in revenues rising 32% and earnings per share increasing to $1.50 ($0.97).

In the following fiscal year, revenues and earnings are estimated at $19.5 million and $1.85 per share. Margins should remain flat as the company increases its internal expenditures on product and market development.

	Earnings Per Share				
	1975	1976E	1977E	Current Quarter	Yield
Rapidata(2b)	$0.70	$0.30	$0.20	Down	-

Revenues and earnings for 1976 will be below our prior estimates of $17.0 million and $0.40 per share. Revenues should be about $15.5 million versus $14.8 million last year, and earnings per share should be about $0.30 versus $0.70 in 1975. The shortfall is due to a loss of revenues from customers who transferred some of their workload to internal systems. In addition, earnings were impacted by price concessions granted to New York Telephone and other start-up expenses. On the positive side, sales of proprietary software have doubled.

In 1977, the potential loss of approximately $1.3 million of revenues on New York Telephone's usage of Honeywell equipment and the start-up costs on installing an IBM/370 model 158 should result in margins being under pressure. The arrangement with several large banks for the marketing of Rapidata services should be a positive factor, although insufficient to offset the other negatives. As a result, we expect revenues to rise only modestly to $16.0 million, and earnings per share to decline to $0.20.

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HISTORICAL & PROJECTED OPERATING RESULTS*

Year Ended	Automatic Data Processing Fol. June	Tymshare Dec.	Computer Sciences Fol. March	Electronic Data Systems Fol. June	Bradford Dec.	National CSS Fol. Feb.	National Data Fol. May	Planning Research Fol. June	Shared Medical Dec.	Applied Data Res. Dec.	Comshare Fol.June	Keydata Fol.July	On-Line Fol.April	Rapidata Dec.
Revenues ($ mil)														
1977E	$270.0	$102.0	$290.0	$185.0	$ 85.0	$ 50.0	N.E.	N.E.	$ 43.0	$ 18.5	N.E.	N.E.	$ 19.5	$ 16.0
1976E	225.0	80.5	250.0	155.0	75.0	42.0	$36.0	$ 160.0	35.5	15.2	$18.0	$14.5	15.8	15.5
1975	187.9	62.9*	219.9	133.0	67.4	35.6	32.9	148.0	22.6	12.7	13.8	14.9	12.0	14.8
1974	154.7	40.5	177.4	123.9	59.0	32.6	31.3	135.3	13.2	10.6	12.3	13.5	11.4	11.5
1973	122.8	35.2	147.0	118.7	48.4	23.7	30.6	110.1	9.5	9.6	9.5	11.7	9.9	9.5
1972	98.1	24.2	120.5	111.9	35.1	16.7	16.0	98.1	6.1	8.2	8.5	9.5	6.3	7.7
1971	76.6	19.4	100.3	91.0	14.5	11.1	9.2	83.3	3.5	6.4	6.8	7.5	3.5	5.4
1970	56.4	16.3	97.2	75.2	11.4	7.8	6.5	66.2	1.0	6.0	5.3	6.1	2.5	4.4
Pretax Margins														
1977E	20.3%	18.3%	9.2%	22.5%	9.5%	13.5%	N.E.	N.E.	27.0%	13.0%	N.E.	N.E.	15.5%	3.8%
1976E	19.5	16.9	8.8	20.5	8.0	13.0	12.2%	5.0%	27.0	11.0	12.2%	3.8%	15.5	6.0
1975	18.6	15.5*	6.6	20.0	12.6	12.4	10.0	4.1	20.8	5.7	9.4	7.9	11.4	16.2
1974	17.6	13.2	4.1	21.9	7.8	10.8	11.2	4.6	17.4	7.5	12.3	3.6	20.6	8.0
1973	18.6	11.1	1.5	24.6	14.0	11.8	9.2	4.9	16.8	13.0	9.5	Neg.	29.1	12.6
1972	17.8	7.9	Neg.	25.5	14.0	10.8	15.0	2.8	14.8	2.6	9.4	9.5	17.6	27.3
1971	16.2	Neg.	Neg.	25.5	15.2	7.2	14.1	6.0	Neg.	Neg.	Neg.	4.0	9.2	18.5
1970	10.5	Neg.	6.6	26.6	20.2	Neg.	7.7	10.1	Neg.	Neg.	Neg.	1.6	12.4	Neg.
Earnings Per Share														
1977E	$ 1.85	$ 2.15	$ 1.05	$ 1.60	$ 1.00	$ 2.90	N.E.	N.E.	$ 2.25	$ 1.05	N.E.	N.E.	$ 1.85	$ 0.20
1976E	1.50	1.55	0.80	1.25	0.75	2.80	$0.50	$ 0.65	1.90	0.80	$ 0.85	$ 0.10	1.50	0.30
1975	1.22	1.21*	0.51	1.10	1.00	1.95	0.38	0.50	1.19	0.29	0.52	0.21	0.97	0.70
1974	0.96	0.85	0.26	1.21	0.50	1.67	0.36	0.47	0.55	0.32	0.55	0.09	1.50	0.28
1973	0.83	0.55	0.08	1.28	0.56	1.44	0.26	0.40	0.34	0.50	0.35	(0.22)	1.92	0.40
1972	0.66	0.25	(0.70)	1.27	0.52	0.81	0.31	(0.85)	0.18	0.10	0.29	0.16	0.87	0.58
1971	0.42	(0.20)	(2.79)	1.05	0.25	0.36	0.13	0.50	(0.58)	(1.08)	(0.01)	0.06	0.32	0.29
1970	0.14	(0.26)	0.25	0.89	0.30	(2.20)	0.06	(0.65)	(1.68)	(1.80)	(1.68)	0.01	0.22	(0.09)
Return on Equity														
1975	23.7	28.2%*	35.1%	19.5%	16.7%	22.8%	11.8%	17.6%	28.0%	16.5%	16.1%	13.8%	11.3%	29.4%
1974	21.8	28.6	27.0	24.9	10.4	25.2	11.5	16.6	30.0	22.7	25.5	8.0	19.8	16.7
1973	19.1	28.2	16.5	20.7	14.4	34.8	9.4	16.7	37.1	36.0	28.0	Neg.	31.1	29.0
1972	18.9	20.6	5.6	25.3	10.8	36.7	13.9	Neg.	31.9	17.9	1.6	13.8	23.4	57.6
1971	18.3	10.2	Neg.	27.2	19.6	24.8	22.3	16.1	Neg.	Neg.	13.0	5.8	11.1	64.5
1970	17.6	4.1	10.4	31.4	17.2	Neg.	11.9	Neg.	Neg.	Neg.	N.M.	N.M.	17.4	Neg.
Revenue Growth														
1976/77E	20.0%	26.7%	16.0%	19.4%	13.3%	19.0%	N.E.	N.E.	21.1%	21.7%	N.E.	N.E.	23.4%	3.2%
1975/76E	19.7	28.0*	13.7	16.5	11.3	18.0	9.4%	8.1%	57.1	19.7	30.4%	(2.7)%	31.7	4.7
1974/75	21.5	21.3	24.0	7.3	14.2	9.2	5.1	9.4	71.2	19.8	12.2	10.4	5.3	28.7
1973/74	26.0	32.1	20.7	4.4	21.9	37.6	2.3	22.9	38.9	10.4	29.5	15.4	15.2	21.1
1972/73	25.2	45.5	22.0	6.1	37.9	41.9	91.3	12.2	55.7	17.1	11.8	23.2	57.1	23.4
1971/72	28.1	24.7	20.1	23.0	142.1	50.5	73.9	17.8	74.3	28.1	25.0	26.7	80.0	42.6
1970/71	35.8	19.0	3.2	21.0	27.2	42.3	41.5	25.8	250.0	6.7	28.3	23.0	40.0	22.7
Earnings Growth														
1976/77E	23.3%	38.7%	31.3%	28.0%	33.3%	3.6%	N.E.	N.E.	18.4%	31.3%	N.E.	N.E.	23.3%	(33.3)%
1975/76E	23.0	28.1*	56.9	13.6	(25.0)	43.6	31.6%	30.0%	59.7	175.9	63.5	(52.4)	54.6	(57.1)
1974/75	27.1	40.0	96.2	(9.1)	100.0	16.8	5.6	6.4	116.4	(9.4)	(5.5)	133.3	(35.3)	150.0
1973/74	15.7	54.5	N.M.	(5.5)	(10.7)	16.0	38.5	17.5	61.9	(36.0)	57.1	N.M.	(21.9)	(30.0)
1972/73	25.8	120.0	N.M.	0.8	7.7	77.8	(16.1)	N.M.	88.9	400.0	20.7	N.M.	120.7	(31.0)
1971/72	57.1	N.M.	N.M.	21.0	108.0	125.0	138.5	N.M.	N.M.	N.M.	N.M.	166.7	171.9	100.0
1970/71	200.0	N.M.	N.M.	18.0	(16.7)	N.M.	116.7	N.M.	N.M.	N.M.	N.M.	500.0	45.5	N.M.

* Unrestated for all preceding years. N.M.: Not meaningful.

**Certain company results have been restated due to acquisitions and/or Accounting changes. Return on equity computed on an as reported basis. All earnings are fully diluted and fully taxed.

COMPUTER SERVICE COMPANIES

ANNUAL SUMMARY

	Auto. Data Processing	Tymshare[1]	Computer Sciences	EDS	Bradford	National CSS	National Data	Planning Research	Shared Medical	Applied Data Res.	Comshare	Keydata	On-Line	Rapidata
Year Ended	June/76	Dec./75	Mar./76	June/76	Dec./75	Feb./76	May/76	June/76	Dec./75	Dec./75	June/76	July/76	Apr./76	Dec./75
Revenues ($Mil)	$187.9	$56.4	$219.9	$133.0	$67.4	$35.6	$ 32.9	$148.0	$ 22.6	$ 12.7	$ 13.8	$ 14.9	$ 12.0	$ 14.8
% Network	15.0%	70.0%	22.0%	–	–	89.0%	100.0%	3.0%	100.0%	–	100.0%	100.0%	100.0%	100.0%
% Batch	78.0	20.0	–	–	–	8.0	–	2.0	–	–	–	–	–	–
% Facilities Mgt.	–	–	20.0	95.0	–	–	–	2.0	–	–	–	–	–	–
% Other	6.0	10.0	58.0	5.0	100.0	3.0	–	93.0	–	100.0%	–	–	–	–
Cost of Rev./Rev.	57.9%	44.7%	N.A.	63.2%	*43.1%	*33.5%	*36.6%	65.7%	48.4%	27.5%	31.6%	61.1%	32.2%	*27.5%
Selling G&A/Rev.	20.6	34.5	N.A.	11.5	*17.4	*20.8	*33.0	30.1	30.4	53.0	45.4	27.7	47.2	*26.3
R&D/Rev.	2.8	4.2	N.A.	5.0	* 1.9	* 6.6	* –	–	–	11.6	12.9	–	4.0	* 6.6
Interest/Rev.	0.2	0.2	2.0	0.2	*24.8	*26.8	*22.8	0.2	0.6	2.9	2.9	3.7	5.2	*23.2
Pretax Margins	18.6%	16.3%	6.6%	20.0%	12.7%	12.3%	9.9%	4.1%	20.6%	5.7%	9.4%	7.9%	11.4%	16.4%
Tax Rate	49.4	50.0	50.0	48.9	50.4	50.7	41.1	49.4	40.3	50.9	44.2	50.3	40.0	47.3
Net Profits ($Mil)	$17.7	$4.7	$7.2	$13.6	$4.1	$2.2	$1.9	$3.0	$2.8	$0.4	$0.7	$0.6	$0.8	$1.3
Return on Equity	23.7%	28.2%	35.1%	19.5%	16.7%	22.8%	11.8%	17.6%	28.0%	16.5%	16.1%	13.8%	11.3%	29.4%
Revenue:- 4 yr. CGR	25.0%	31.0%	22.0%	10.0%	47.0%	34.0%	38.0%	15.5%	60.0%	18.7%	19.4%	18.7%	36.0%	29.0%
E.P.S.:- 4 yr. CGR	31.0%	N.M.	N.M.	1.2%	41.0%	50.0%	31.0%	0.1%	N.M.	N.M.	N.M.	37.0%	32.0%	25.0%
Capitalization	$104.4	$25.3	$74.4	$85.2	$44.7	$10.6	$20.9	$57.4	$10.7	$3.6	$9.6	$8.4	$12.9	$6.9
% Equity	94.4%	82.5%	30.0%	89.3%	97.3%	96.3%	99.2%	41.0%	92.6%	59.6%	58.0%	50.6%	56.0%	62.9%
% Debt	2.6	12.4	70.0	2.6	–	3.1	–	58.2	–	40.4	42.0	49.4	42.2	28.3
% Deferred Taxes	3.0	5.1	–	7.1	0.1	0.6	0.8	–	7.4	–	–	–	1.9	8.8
% Minority Interest	–	–	–	1.0	2.6	–	–	0.8	–	–	–	–	–	–
Goodwill/Equity	24.3	16.9	7.6	–	43.4	7.1	19.3	19.6	–	–	–	–	–	–
Def. Charges/Equity	–	2.9	–	8.3	–	–	1.9	7.6	–	–	–	–	–	–
Employees	6,420	1,300	7,000	3,942	1,800	602	1,164	6,948	400	280	321	285	245	330
Rev./Employee (000)	$29.3	$43.4	$31.1	$33.7	$37.4	$59.1	$28.3	$21.3	$56.5	$45.4	$43.0	$52.3	$49.0	$44.8

(1) Results as reported in last annual report. Tymshare has not as yet disclosed the revised details for year ending December 1975.

* Companies reported salaries, equipment costs, R&D, and other as a percent of revenues.

COMPUTER SERVICE COMPANIES

QUARTERLY UPDATE

	Automatic Data Processing	Tymshare	Computer Sciences	Electronic Data Systems	Bradford	National CSS	National Data	Planning Research	Shared Medical	Applied Data Res.	Comshare	Keydata	On-Line	Rapidata
Last Reported Quarter:	September	September	October	September	September	November	November	September	September	September	September	October	October	September
Next Reported Quarter:	December	December	January	December	December	February	February	December	December	December	December	January	January	December
Reported Equity ($ in millions)	$102.9	$28.5	$29.3	$78.2	$45.4	$12.5	$20.4	$25.4	$18.4	$3.3	$6.0	$4.4	$7.9	$4.7
Reported Debt ($ in millions)	5.9	8.2	52.9	2.2	-	4.0	0.1	33.0	0.0	0.5	$3.4	$3.8	$6.0	$1.9
Revenues:														
Year-to-Year Change														
Last Reported Quarter	28.4%	24.2%	8.2%	14.8%	11.4%	16.8%	0.1%	24.0%	65.2%	36.2%	8.0%	(3.3%)	38.5%	4.0%
Next To be Reported Quarter	26.7%	26.3%	14.6%	16.9%	13.8%	17.2%	3.7%	24.7%	16.0%	17.6%	21.9%	(2.7%)	25.0%	5.4%
Earnings Per Share:														
Year-to-Year Change														
Last Reported Quarter	23.1%	8.0%	66.7%	(10.3%)	(54.5%)	44.0%	100.0%	50.0%	35.1%	625.0%	54.5%	(50.0%)	100.0%	(85.0%)
Next to be Reported Quarter	23.3%	34.6%	61.5%	0.0	(44.4%)	33.3%	18.2%	15.4%	41.0%	150.0%	325.0%	(60.0%)	30.0%	(29.4%)
Revenues: Next to be Reported Quarter* Year-ago Quarter (mil.)	$57.0/ 45.0	$19.7/ 15.6	$62.0/ 54.1	$36.0/ 30.8	$19.0/ 16.7	$10.9/ 9.3	$8.4/ 8.1	$45.0/ 36.1	$ 9.4/ 8.1	$4.0/ 3.4	$3.9/ 3.2	$3.6/ 3.7	$4.0/ 3.2	$3.9/ 3.7
Pretax Margins: Next to be Reported Quarter Versus Year-ago Quarter	-	1.5pt.	2.5pt..	(2.0)pt.	(5.0)pt.	(0.3)pt.	-	0.5pt.	2.0pt.	7.0pt.	5.0pt.	(5.0)pt.	1.0pt.	(10.0)pt.
Tax Rate: Next to be Reported Quarter Versus Year-Ago Quarter	0.1pt.	0.6pt.	(5.0)pt.	2.0pt.	(3.5)pt.	(9.0)pt.	-	(2.0)pt.	6.0pt.	(-20)pt.	(-10)pt.	-	(2.0)pt.	(15.0)pt.
Earnings Per Share: Next to be Reported Quarter	$.37/.30	$.35/.26	$.21/.13	$.27/.27	$.15/.27	$.72/.54	$.13/.11	$.15/.13	$.55/.39	$.20/.08	$.17/.04	$.02/.05	$.39/.30	$.12/.17
Earnings Per Share: 12 Months Ended Year From Reported Quarter	$1.56	$2.02	$0.92	$1.33	$0.83	$2.84	$0.56	$0.66	$2.20	$0.95	$0.94	$0.12	$1.68	$0.25
Recent Price*	29	19b	7	17	9	23	5b	4	27b	5	5b	2b	22	2b
Price/12 mos. EPS	18.6x	9.4x	7.6x	12.8x	10.8x	8.1x	8.9x	6.1x	12.3x	5.3x	5.3x	16.7x	13.1x	8.0x
No. Shares (millions)	14.1	4.3	14.3	12.5	4.0	1.1	4.4	6.1	2.7	1.2	1.4	2.7	.86	1.9
Market Value ($ in millions)	$408.9	$81.7	$100.1	$212.5	$36.0	$25.3	$22.0	$24.4	$72.9	$6.0	$7.0	$5.4	$18.9	$3.8
Dividend	$0.24	-	-	$ 0.60	$0.20	$0.20	-	-	-	-	-	-	-	-
Yield	0.8%	-	-	3.5%	2.2%	0.9%	-	-	-	-	-	-	-	-

* As of December 28, 1976.

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The attached chapter is from Richard Brealey's Security Prices in a Competitive Market, M.I.T. Press, 1971. It presents the results of some studies which distinctly contravene some conventional wisdoms.

Mr. Brealey is well-respected among academics interested in matters of market behavior and finance and is often cited, particularly his earlier (1969) classic An Introduction to Risk and Return in Common Stocks.

While it implies no judgment as to the accuracy or applicability of this material, I thought you might find Brealey's writings of interest.

Regards,

Don

Chapter 4 Mergers and Acquisitions

Merger activity appears to be subject to periodic fluctuations that correspond roughly to the business cycle.[108] However, in the postwar years the number of mergers rose sharply, until in 1968 they absorbed an unprecedented 2400 industrial companies. The role and impact of this development are beyond the scope of this book. Nevertheless, some of the reasons adduced for mergers raise the same kinds of issues as the other chapters in this section, so that it is worth considering briefly whether a merger of itself can raise the value of a company's stock.

Many of the arguments for growth through acquisition lay stress on the fact that the combined company may be able to secure a higher return on capital than if the firms continued to operate separately. For example, the merger may lead to a reduction in competition and so allow the company to increase the price of its products. This motive acted as a major stimulus to merger activity in the early years of the century, though subsequent antitrust legislation has severely limited the opportunities for such behavior. A merger may also be justified if it assists a company to reach a more efficient size, and for this reason recent mergers in the British computer, automobile, textile, and electrical industries have received government encouragement. However, too little is known of the relation between size and profitability in particular industries to permit any generalizations on the scope for such gains, although it is worth bearing in mind that the merger as such does not bring economies of scale. These follow only when the product line is rationalized or the sales forces integrated or production redistributed. Such tasks are not easily accomplished. Mergers may also contribute to a higher return on investment if they lead to fuller utilization of existing capacity. A typical example is the case of the firm with the underemployed sales force. Acquisition of a company with a related product line may be an effective means of overcoming the problem.

These arguments apply to only a small proportion of the mergers that have been consummated in recent years. Partly because of governmental impediments to horizontal or vertical integration, the postwar period has been characterized by a rapid growth in conglomerate mergers. On a conservative interpretation of the term, over 40% of recent mergers have taken this form. Because the process extends the company's product line into unrelated areas, it cannot easily be justified on the grounds that it reduces competition or allows economies of scale. In only a very special sense can the conglomerate hope to eliminate spare capacity, for typically the head office itself is the only resource that is shared by the operating divisions. Yet,

rather than permit a reduction in the number of administrative staff, the process of diversification is likely to increase the complexity of their task. Nevertheless, the principal case for the conglomerate merger is that it may enable more effective use to be made of an exceptionally able management. This is most likely to occur when the acquisition offers the only practical method of ridding the acquired company of a president who persistently acts against the best interests of his shareholders. There is some disagreement about the opportunities for management improvement offered by these means. The belief that managerial skills are readily transferable may be a myth, for the ability to make correct decisions is intimately bound up with the manager's detailed knowledge of the peculiarities of his own business. If he is called upon to make decisions in unrelated areas, his judgment will almost inevitably suffer.

Even if the conglomerate merger does not lead to increased efficiency, the stockholders of the acquiring company may still benefit if the purchase can be made at a favorable enough price. However, the business of looking for undervalued stocks is a competitive one, and the corporate bidder has few natural advantages. Not only may he find it difficult to obtain impartial sources of information about companies, but when he shows his hand, he is liable to cause the market to reevaluate the stock or to induce a competitor to enter a further bid. Moreover, once a company has been acquired, it cannot be disposed of easily. Perhaps the single advantage that the corporate bidder possesses is the fact that he can pay for his investments with currency whose value he is best equipped to judge.

A policy of diversification by merger is sometimes justified on the grounds that the corporation's existing business offers too little opportunity for the profitable employment of the company's funds. It is at this point that one encounters a divergence of interest between the management and the shareholders. If the continued growth of the corporation is admitted as an end in itself, a plausible case may be made for a policy of acquisition. However, the price of common stock is likely to be better protected by an increase in the payout ratio or by the repurchase of stock.

A similar but more popular argument stresses the fact that diversification insures the company against the effect of a setback in any one sector. This again is a perfectly valid argument if the perpetuation of the firm is regarded as an end in itself. Otherwise, in a rational market it should make little difference whether the diversification is performed by the company or left to the investor. Indeed, in certain circumstances the flexibility of homemade diversification may be an advantage.

In weighing these suggested benefits it is important to remember that the acquirer can usually expect to pay a premium over the existing market price. Several studies of mergers during the postwar period have indicated that the average premium has been in the region of 25% and that in approximately one-fifth of the instances it has been in excess of 50%.[16,61,92,94,156] This constitutes prima facie evidence that the stockholders of the acquired companies have for the most part benefited from the mergers. The much more interesting question is whether the acquiring company likewise profits from its actions. Since the potential gains are likely to be greatest where the merger does not involve product extension, it may be useful to inquire first into the effects of such mergers.

Commercial banks have not been left behind in the postwar merger wave.[32] Between 1950 and 1962 nearly 2000 banks with resources of over $40 billion were absorbed by other banks. In most cases the acquiring companies appear to have paid a sizable premium for their rivals. In return, they presumably expected to realize economies of scale while at the same time removing a competitor. To assess the effects of this activity, an analysis was made of the record of 165 large commercial

banks during this period. Approximately a third of these banks made no acquisitions. Their earnings per share rose over the decade by 99%. Another third acquired one or two rival banks. Their earnings rose by 66%. The remainder entered into three or more mergers and achieved an earnings growth of 63%. These quite significant differences suggest that the economies effected by merging were rather less than the companies anticipated. Consequently, it is not surprising that the greatest appreciation was shown by the stocks of banks that relied solely on internal growth. These issues appreciated 101% over the period, the stocks of banks participating in one or two mergers gained 71%, and those of the remainder rose 59%. Broadly similar findings were secured when the banks were analyzed separately according to their geographical location or the state banking regulations.

There is some reason to suspect that this sample may have consisted principally of the most successful of the nonmerging banks. Yet this is not the only evidence to cast doubt on the merits of growth through merger with competitive companies. Between 1955 and 1961 there were 7 occasions on which two advertising agencies joined forces to produce a firm with total billings in excess of $10 million.[71] The solid line in Figure 8 shows the average growth in the revenues of these firms from four years before the merger until four years after. For comparison, the dotted line depicts the fortunes of pairs of comparable agencies that remained independent, and the broken line represents the progress of single agencies that were as large as the combined firms. In the years before they were united, the merging agencies grew at a rate similar to that of their larger competitors but more slowly than that of their nearest equivalents. In the following years the merging firms fared significantly less well than either of the other two groups. In all but 1 of the 7 instances the merger heralded a period of clearly inferior performance in terms of revenues. It is possible that in terms of profits the picture would have been somewhat different, but the gross profit and cost structures of advertising firms are so closely determined that it would have been very difficult for the combining agencies to increase their margins sufficiently to make up for the shortfall in billings.

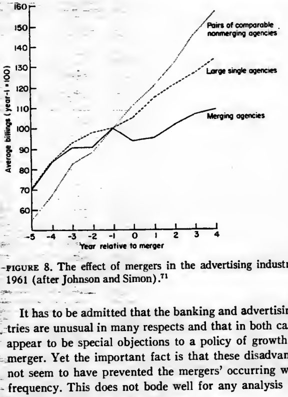


FIGURE 8. The effect of mergers in the advertising industry, 1955–1961 (after Johnson and Simon).[71]

It has to be admitted that the banking and advertising industries are unusual in many respects and that in both cases there appear to be special objections to a policy of growth through merger. Yet the important fact is that these disadvantages do not seem to have prevented the mergers' occurring with some frequency. This does not bode well for any analysis that also comprehends conglomerate mergers.

It might be well to begin such an investigation by considering the short-run effects on the stock price. This can be done by looking at 35 mergers between New York Stock Exchange companies during the period 1961–1965.[16] For purposes of comparison a second group of companies was selected. They did not engage in merger activities but were as far as possible similar to the merging companies in terms of industry, quality, size, and sales growth. The performance of the acquired issues relative to that of their equivalents is shown by the dotted line in Figure 9. Shortly before the announcement of the impending merger the stock price began to rise. The significant improvement in price in the month before the public disclosure seems to point either to buying by the acquiring firm or to some leakage of information. The principal rise, however, occurred in

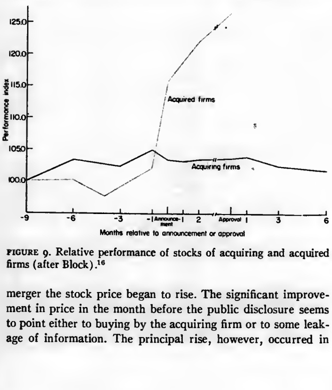


FIGURE 9. Relative performance of stocks of acquiring and acquired firms (after Block).[16]

the month of the announcement, when the stocks on the average appreciated 13%. Since the merger negotiations were in every case successful, it is not surprising to see that the stocks continued to appreciate as the progress of the negotiations became known. However, an investor could have profited from these later gains only if he had managed to avoid other situations where the merger talks were eventually broken off.

The solid line in Figure 9 depicts the performance of the stocks of the acquiring companies relative to that of their near equivalents. These issues behaved in a much less dramatic fashion, and at no point did they depart by more than 2% from their level six months before the announcement of the merger. It therefore seems that the stockholders of the acquiring company do not customarily greet the news with any degree of enthusiasm.

This reaction is equally obvious in the case of tender offers.[110] For example, during 1968 and early 1969 there occurred 20 major cash tender offers, which sought on an average nearly a third of the target company's outstanding shares. For this stock the bidder paid a price that was 18% above the market level on the previous day. The market apparently was not convinced of the wisdom of this premium, for by the end of the month only 2 of the stocks stood above the tender price, and the average level was 10% below. Six months after the offer the stocks remained 10% below the tender price.

To see whether such market hesitancy is justified, one needs to look at the long-term impact of acquisitions. For this purpose an analysis was made of the merger activity of 478 large industrial firms during the period 1951–1961.[119] The firms were segregated into four groups according to the number of companies that they acquired during this period. The average ten-year change in the stock price of each group is shown in Table 9. The results are not easy to interpret. On the one hand, the stockholder seems to have fared much better where

TABLE 9. *Average Annual Appreciation of 478 Stocks, 1951–1961, Grouped According to Merger Activity*

	No Mergers	1–5 Mergers	6–10 Mergers	11+ Mergers
No. of stocks	48	214	142	74
Appreciation (%)	+22.8	+12.7	+13.2	+15.1

Source: After Reid.[119]

the growth was purely internal; on the other, it looks as if a very active merger policy is preferable to a more modest approach. The difference in the performance of the merging and nonmerging companies is somewhat too pronounced to be credible and suggests the possibility of some bias in the sample; it was based on the *Fortune* list of large companies in 1961. Since a firm that did not engage in acquisitions is likely to have become large only if it also increased its equity earnings, the sample may well include only the most successful among these firms. This suspicion is partly confirmed by the fact that the whole group appreciated much more rapidly than Standard & Poor's Index. Indeed, by this yardstick all four categories of stock performed well.

Even if this bias does exist, it should not create such serious problems if one were simply to inquire which form of merger proved to be the most successful. Table 10, therefore, shows the average change in the stock price according to the character of the firm's acquisition policy. The surprising thing about the result is that it is the conglomerate merger that seems to convey the greatest stockholder benefits. However, at this point another difficulty looms up. The analysis provides no indication of the extent to which these price movements occurred before the merger. This omission may mean that the conclusions drawn from Table 9 are slightly distorted, but the chances of misconstruction are far larger in the present case, for it seems only too likely that conglomerate acquisitions are made after a relative improvement in the stock price.

TABLE 10. *Average Annual Appreciation of 430 Stocks, 1951–1961, Grouped According to Type of Merger Activity*

	Horizontal	Vertical	Product-Related	Conglomerate
No. of stocks	195	22	167	46
Appreciation (%)	+12.6	+9.3	+12.9	+18.2

Source: After Reid.[119]

Selection bias is not a serious worry in the case of two similar studies of the effect of mergers. One of these examined the performance of the common stocks of 43 acquiring companies over a period that began two years before the merger and ended at least two years after.[68] In each case the rate of return was compared with the average return of all New York Stock Exchange (NYSE) issues belonging to the same industry group. In only 10 cases did the stock of the acquiring firm show the superior investment performance, and on the average its rate of return was 10% below that of the industry group.

The other analysis considered 21 large industrial corporations that expanded significantly by means of acquisition during the years 1946 to 1960.[79] For each company the average level of earnings in the five postmerger years was expressed as a proportion of the average level in the preceding five years. These growth rates were then compared with the equivalent figures for nonmerging but otherwise similar firms. The results are shown in the first column of Table 11. In 12 of the 21 cases the earnings growth of the merging company was inferior to that of the company that relied primarily on internal expansion. On the average, the former group showed a relative decline in earnings of 1%. The second column in the table shows

TABLE 11. *Growth in Earnings and Stock Price of Merging Company Relative to That of Nonmerging Company*

Merging Company	Nonmerging Company	Relative Earnings Change (%)	Relative Price Change (%)
PhilMorr	Am Tob	+1	−9
Nat Distil	DistSeag	−36	−40
McCrory	GrantW	−4	−17
Revlon	AvonPd	+17	−77
Sunray Oil	Richfd Oil	−21	−8
Pure Oil	Sun Oil	−14	+3
Beech-Nut	Wrigley	−5	+25
HookerC	Wyand Ind	−18	NA
Merck	ParkeDav	+10	+35
Allis Chalm	CaterTr	−63	−57
NatGyps	USGypsm	−13	0
J Morrell	Hormel GA	+43	+91
SunshBis	Un Bis	+29	+29
FedMog	Timken	−8	−8
Ideal Cem	LehPCem	−8	−5
Det Steel	McLouth	−58	−46
Acme St	GraniteC	−25	−59
Am Ag Chem	Va Chemcl	+28	+13
Assd DG	MarshFd	+8	+35
Nat Tea	Gt A & P	+41	+53
StokeVC	Libb McN	+80	+5

Source: After Kelly.[79]

the five-year change in the stock price of the merging companies as a percentage of the change in the stock price of their competitors. The results are similar. In just over half of the cases the stock of the merging firm showed a relative decline, with an average falloff of 2%. Thus, whether measured in terms of earnings or stock price, the acquisition policy seems to have induced an insignificant fall in the relative rate of growth. It is interesting to note that the mergers undertaken by the top three or four companies in the table were largely conglomerate in

character. The performance of these firms was markedly inferior to that of the other companies, although the difference is not statistically significant.

The validity of this kind of exercise depends on the extent to which the companies chosen for comparison resemble the merging firms in every respect except their attitude toward acquisitions. This difficulty might be avoided if one were to compare the returns obtained by shareholders in the postmerger years with those obtained before the announcement of the merger. This approach too has its problems, for it is possible that firms contemplate merger only following an unusual rise or fall in the price of their stock. Nevertheless, it may help to provide some check on earlier findings. With this in view, an analysis was made of a sample of 34 companies listed on the NYSE that entered into mergers during the 1950s.[132] In half the cases the shareholder received a higher return over the five-year period ending six months before the announcement of the merger than he did over the succeeding five years. As in the previous investigation, the mergers between companies with related product lines appeared to be marginally more successful. Quite apart from the possible bias already mentioned, this test is once again too limited in scope to provide any definitive answers, but it does furnish a little more reinforcement for earlier results.

More comprehensive evidence regarding the question is contained in a study of 82 mergers occurring between 1954 and 1967.[92] Unfortunately for the present purpose, this analysis was concerned only with the experience of shareholders who exchanged their stock in the acquired company for relatively complicated assets such as convertible preferred stock, convertible debentures, or warrants. Over the two years following the consummation of the merger these securities appreciated by an average of 9.5% per annum. Over the same period Standard & Poor's Composite Index appreciated by an average of

7.4%. The contrast between the two groups of securities would probably be even more marked if allowance were made for the difference in dividend and interest payments. Since in most of these cases the shareholders in the acquired firm were rewarded with convertible bonds and preferred stocks, it is likely that the common stock of the acquiring company also fared a little better than the index. Whether or not this was a consequence of the merger is more questionable. If the choice of relatively complicated forms of financing is an indication that the firms are highly leveraged and willing to take above-average risks, then the high rates of return are only to be expected. In view of this problem one can probably conclude little more than that the mergers had no great effect one way or the other on the stockholder's return.

The discussion at the beginning of this chapter implied that a company usually justifies an acquisition policy in one of three ways. Either it hopes to reduce its risks by diversification, or it believes that the acquired stock is undervalued relative to its own, or it expects the merger to lead to improved efficiency. Since the investor can equally well undertake his own diversification, he would be foolish to pay to have the company do it for him. On the other hand, if the management is right in its analysis, acquisitions made for the other two reasons should lead to a rise in the price of the stock.

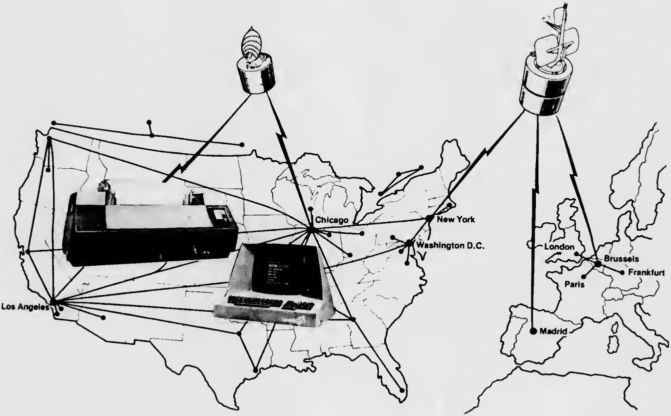
The high premiums paid to the shareholders of the acquired company create a strong presumption that they fare very well from the merger. The performance of the acquiring firm proved far less easy to assess. Certainly there was no indication of any unusual rise in its earnings or stock price, and there was some suggestion that the merger tends to precede a slightly inferior rate of growth. It would be foolish to conclude from this that the shareholder cannot expect to benefit in individual cases, for many mergers are clearly well conceived. One of two things must therefore follow. Either an equally large number of mergers are ill advised, or companies tend to expand through merger when the prospects for their existing business are deteriorating.

The evidence was not sufficiently comprehensive to permit any useful judgment on whether certain forms of combination are more efficient than others, though it was apparent that any advantages that the shareholder derived from the merger were directly linked to the resultant growth in earnings. There was no indication that the market places more value on the earnings of companies that achieved diversification by merger. Therefore, mergers that are inspired only by the desire to diversify or employ surplus cash or project a more aggressive image seem unlikely to bring a rise in the price of the stock.

The fact that growth through acquisition is no more effective than that from internal resources is perhaps not surprising. There is no reason to suppose that secondhand assets are a better value than new ones. The suggestion that mergers may portend a below-average rate of growth is more disturbing, but without knowing how rapidly the companies would have grown in the absence of the acquisition, one should be cautious about assuming that their actions are against the stockholder's interests. There is even less reason to suppose that mergers are detrimental to the investing public as a whole, for any losses to the acquiring firms seem to be fully counterbalanced by the gains to the shareholders of the acquired companies. The fact that the investor does not necessarily possess management's concern with corporate power and growth always creates a potential conflict, but there is no evidence to suggest that this has serious economic consequences.

COMPUTER DATA SERVICES

Rapid Growth For The Right Answers



PBT
Prescott, Ball & Turben

February 17, 1977

COMPUTER DATA SERVICES

Rapid Growth For The Right Answers

Company Features On:

- Automatic Data Processing
- Computer Sciences
- Electronic Data Systems
- Manufacturing Data Systems
- National CSS
- Reynolds and Reynolds
- Tymshare

David A. Henwood, C. F. A.
216/687-6629

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INVESTMENT SUMMARY

The Data Services industry offers rapid, sustainable and, in many cases, highly visible growth. Companies possessing the ability to stay in the forefront of solving customer problems and also having the ability to deliver the solution processed in the mode desired by the customer (batch, remote batch, interactive, or inhouse "minis") have the best possibility of rapid growth. It is imperative that such companies have strong marketing, finances, returns on capital and able management. Since data service revenues largely relate to basic customer requirements in accounting, payroll, inventory control and to management's information gathering needs, such transactions tend to be regularly recurring and provide the stable underlying revenue base so necessary for visible and sustainable growth.

The industry can be broken down into three investment tiers: (1) companies possessing broad application capabilities, high quality financials, a dominant market position and a record of consistent growth, i.e. -- long term investment grade; (2) companies with strong application capabilities, medium to high quality financials and rapid, but less predictable growth potential and (3) companies with a narrower application specialization, smaller size but possessing either a proprietary market position or rapid growth potential due to other factors. The third group is often the most speculative and most volatile.

In tier one is Automatic Data Processing, the one company in this industry viewed to be of highest quality and of long term investment grade. ADP has now achieved 27 years of sustained growth from strong internal market penetration and a successful acquisition program. Based on our analysis of ADP's growth capabilities, PBT estimates future earnings growth at near 20% per annum with about 1/4 or less of this growth derived from acquisitions. ADP is strongly recommended on both its long term merits as well as its short-to-medium term earnings outlook.

In the second tier I would place Computer Sciences, Electronic Data Systems and Tymshare. These companies all have strong application capability and areas of market dominance. As outlined in the company studies, PBT favors Tymshare for its rapid long term growth potential and Computer Sciences as a speculation on weakness. The third tier is made up of smaller companies with narrow industry expertise and yet possessing strong technical capabilities, finances and profitability. Companies such as Manufacturing Data Systems, National C S S and The Reynolds and Reynolds Company possess such attributes. On a near term basis, Reynolds with strong quarterly earnings and a modest nine times P/E is viewed as most attractive. However, long term MDSI (at $8 is selling at a ten times P/E) appears to have the internal financial, marketing and systems capability to sustain earnings growth at 20 - 25% per annum and is an excellent quality, smaller company for aggressive accounts oriented to the intermediate to long term.

The data services industry canbest be characterized by rapid growth, high profit margins and rates of return and strong finances. Foreign exposure in all cases is small with most companies realizing less than 5% of revenues and earnings overseas. ADP realizes 8% of revenues overseas. However, only Automatic Data Processing, Bradford National, E.D.S., National CSS and Tymshare currently pay dividends and only E.D.S. and Reynolds and Reynolds have yields over 3%. The company with the greatest capability of markedly increasing its dividend is Automatic Data Processing; this is expected to evolve over the next several years.

DATA SERVICES INDUSTRY

The computer service industry has a history of very rapid industry growth and high fatality rates among very small companies. Industry revenues have grown nearly 33% per year from about $250,000 in 1965 to about $4.3 billion in 1975. While the market is maturing, particularly in batch processing services (providing processing through a data service center for next day delivery), opportunities for growth remain substantial through the providing of time-sharing and remote batch services and the development and marketing of specific industry-oriented application software which solve basic customer problems.

The data services industry is made up of companies offering assorted services to both sophisticated and non-sophisticated users. Data service companies basically provide two general types of services: (1) computer processing capability, and (2) software and systems--the procedures to direct the computer to more effectively process a particular application (payroll, accounts receivable, inventories, order entry, etc.) or to provide access to a proprietary data base of information.

In actuality, computer time can be provided to the user in many modes--through a data service center (batch processing), through on-line terminal entry (remote batch or interactive), or through an inhouse computer which is supported by the service company with applications software, service support, etc.

The clearest way for a service company to differentiate its service and to provide value added to the customer is through more sophisticated applications software, or systems designed for a specific industry which better solve the user's problems. The user's primary interest is the best cost-effective solution to his problems and not the computer vehicle used to deliver it. However, the timeliness of certain types of information can increase the necessity of fast processing and faster retrieval of the information to the customer which would dictate a remote access or interactive processing mode.

INDUSTRY GROWTH PROJECTIONS

Industry sources vary greatly in both the estimates of current size of the computer data services industry as well as its component sector growth rates. Leading independent industry research specialists, such as The International Data Corporation, Quantum Sciences and Arthur D. Little, have projected total industry annual growth rates of 13 - 20% over the next five years (1975 - 1980).

Five-year projections of two of the leading market research sources by major sub-sector are detailed on the following page.

TABLE # 1
Computer Services Market
(Millions of Dollars)

	Quantum Sciences			IDC		
	1975	1980	Growth	1975	1980	Growth
Batch Processing	$2162	$2928	6.0%	$1740	$2608	8.4%
Remote Computing:						
Autotransaction	NA	NA		650	2880	
Raw Power	NA	NA		725	2180	
Total	1203	2896	19.4%	1375	5060	29.8%
Software Support Services:						
Custom Contract	NA	NA		500	1290	20.9%
Packaged	NA	NA		250	920	29.8%
Total	1166	2667	17.7%	750	2210	24.1%
Facilities Management	1266	2204	11.0%	415	820	14.6%
TOTAL	$5,797	$10,695	13.0%	$4,280	$10,698	20.1%

NOTE: Figures above are estimates of Quantum Sciences and The International Data Corporation.

As shown above, there are deviations in the size of the sub-sections but both agree that the two fastest growing sectors over the next five years will be software support and services and remote computing services. Specifically within these groupings, the growth of remote autotransaction and packaged software are identified as the fastest growth sectors by I. D. C. (International Data Corp.). These individual sectors will be examined separately later in this report.

Arthur D. Little, a third industry source, estimates total data service industry revenues of $4.7 billion in 1975 about half way between the above estimates. ADL expects revenues of generalized resource companies (Control Data, Computer Sciences, General Electric, etc.) to grow at about 10-15% a year through 1980 while companies in the market-specialized part of the business (Automatic Data, Tymshare, MDSI, Reynolds and Reynolds, etc.) should achieve 20 - 25% a year average revenue growth over this five-year period.

The question is why should the industry revenue grow as rapidly as the industry sources forecast? The answers are many: users need basic processing of payrolls, general accounting, inventories, orders, etc. either inhouse or through a service agent, plus they need additional problem solving and information status reporting to operate more efficiently.

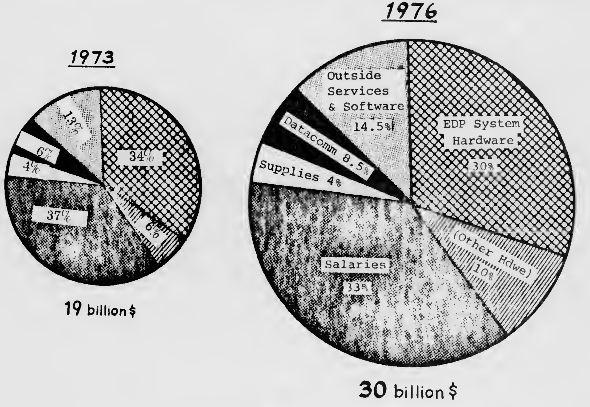
It is the ability of the data services industry to deliver cost effective solutions which are critical to the user's day-to-day decision making efficiency, cost cutting and opportunity analysis, thus, making such services critical for users wishing to maximize bottom line results.

USER EXPENDITURES

Every vendor's goal is directed at reducing the labor portion of a user's data processing budget. As a consequence of transferring labor into equipment, industry sources expect by 1980 that there could be as much as a 10% reduction in the share of the typical user's total data processing budget allocated for personnel costs despite rapidly increasing salaries and decreasing hardware prices. Many small business systems require no, or little, data processing experience. Small computer systems such as the IBM System/32 are providing auto-instructional programs which teach the naive computer operator how to load and run the system.

In 1971, approximately 45% of some $17.5 billion in U.S. user data processing expenditures went for salaries of EDP operations, programmers, systems analysts, et al and about 8½% went for contract and software packages and other outside processing service. By 1973, user's inhouse salaries for data processing personnel fell to about 37% of total expenditures and outside services and software climbed to 13%. As shown below, this trend has continued based on I.D.C. estimates for 1976.

DISTRIBUTION OF U.S. USERS' EDP BUDGETS



The fastest inflation factor inherent in a user's data processing budget is for inhouse personnel costs. Both the direct costs (salaries and wages) of personnel and the indirect costs(pension, insurance and other benefits) are increasing at faster rates than the inflation costs of hardware, outside services, supplies, etc.

Studies by I. D. C. on user expenditures over the last several years from a sampling of 128 user companies revealed the following growth patterns in user budgetary outlays by major components.

TABLE #2
IDC Sample Survey
Year-to-Year Sample Survey
In User Outlays

	1974	1975	1976
All User Hardware			
Real Growth	9.5%	9.0%	8.0%
Inflation	2.0	4.0	3.0
Inhouse Salaries			
Real Growth	8.0	2.0	5.0
Inflation	6.0	8.0	8.0
All Outside Services			
Real Growth	17.0	15.0	17.0
Inflation	2.0	2.5	2.0
Total User Outlays			
Real Growth	14.0	10.0	13.0
Inflation	3.0	4.5	4.0

Source: International Data Corporation, Waltham, Massachusetts

As a result of the above trends, there is continuing to be a steady shifting of user needs away from the buying of machine time toward the buying of tailored application offerings and services which sharply reduce or totally eliminate the need for inhouse personnel. Users need solutions to problems more than mere raw power alternatives to inhouse systems.

Service companies can offer not only highly sophisticated application systems on an industry specialized basis but also proprietary data bases useful to that industry which are usually not offered by an OEM mini-system supplier. Longer term users will be buying more specialized services from specialized data service companies and also from leading data processing users having large inhouse computer systems with remote capability (i.e., McDonnell-Douglas Automative, Boeing Computer Services, etc.). It is likely that dedicated information system (DIS) vendors will appear in many industries and will market specialized industry application software, batch services and some may offer network information services.

THE SERVICE COMPANIES: SIZE & RELATIVE PROFITABILITY

Using I. D. C.'s numbers for market size, as well as their company's revenue distribution numbers for 1975, the following competitive profile unfolds:

TABLE #3
Revenue Breakdown by Company
($ in Millions)

		Data Services Revenues*		Data Services Revenues		% of Total
Companies	Year Ended	1975	% of Ind. Total	1976E	% Growth	Company Revenues#
Control Data Corp.	12/31	$ 221.0	5.2%	$250.0	+13.06E	18%
Computer Sciences Corp.	4/2	219.9	5.2	240.0	+ 9.0E	100
Automatic Data Proc.	6/30	154.7	3.6	187.9A.	+21.0	100
Electronic Data Systems	6/30	119.4	2.8	129.0A	+8.0	100
Systems Development Corp	6/30	108.6	2.5	109.9A	+1.0	100
General Electric Corp.	12/31	105.0	2.4	NE	-0-	1
NCR Corp.	12/31	64.0	1.5	72.0	+12.0E	3
Wyly Corp.	12/31	63.1	1.5	NE	-0-	100
Bradford National	12/31	62.2	1.4	67.0	+8	89
Planning Research	6/30	57.0	1.3	61.0A	+7.0	41
McDonnell-Douglas Auto.	12/31	56.0	1.3	NE	-0-	2
Tymshare	12/31	56.4	1.3	76.5	+35.6E	95
National CSS	2/29	35.6	0.9	41.8	+17.0E	100
Boeing Computer Services	12/31	35.0	0.8	NE	-0-	1
Reynolds & Reynolds	9/30	29.3	0.7	35.4A	21.0	37
		$1,387.2	32.4			
2,235 Smaller Companies		2,894.0	67.6			
Total Industry Revenues		$4,280.0	100.0%			

#Based on latest actuals, excluding interest income.
*Based on 1975 data as originally reported.

Several of these above companies generate a relatively small portion of their total revenues from data service activities. Based on the latest annual figures available, Control Data's data service revenues represented only 18.1% of the total revenues; General Electric's represented less than 1% of their total revenues; NCR's was 3.0% of 1975 revenues and McDonnell-Douglas' a modest 2% of total revenues.

The keys to growth and prosperity in the data services industry are to develop size and economies of scale in processing facilities whether they be batch or time-sharing services and to couple these hardware capabilities with specific market knowledge and application sophistication. It is more important to be the most efficient industry problem-solver than to merely be competing in those sectors of the industry expected to grow the most rapidly. Common industry solutions can,if successful in the market place, significantly enhance the rate of profitability realized on services rendered.

The latest information available on industry profitability shows that the most profitable of the independent industry service companies are Automatic Data Processing, Electronic Data Systems, Tymshare and Manufacturing Data Systems.

TABLE #4
Industry Profitability Comparisons
($ in Millions)

Companies	Fiscal Year Ends	Operating Revenues	Operating Profit	Profit Margin
Automatic Data Processing	6/30/76	$187.9	$35.2	18.7%
Bradford National	12/31/75	62.2	3.6	5.8
Computer Sciences	4/2/76	219.9	18.8	8.5
Contract Services		171.4	12.6	7.3
Infonet		48.5	11.0	22.6
Electronic Data Systems	6/30/76	129.0	23.0	17.8
MDSI	8/31/76	16.1	3.7	23.2
National CSS	2/29/76	35.6	4.4	12.3
National Data	5/31/76	31.3	2.5	7.9
Reynolds & Reynolds#	9/30/76	35.4	5.1	14.4
Systems Development	6/27/76	109.9	4.8	4.4
Tymshare	12/31/75	56.4	9.3	16.5

#EDP operations only, operating profit is an analyst's estimate derived from taking the gross profitability of data services and allocating S, G&A based on the contribution of data services to total revenues.

Studies by I. D. C. and others indicate that processing companies with revenue greater than $10,000,000 annually are above the threshold to realize economies of scale benefits. Software service companies show much better margins in the lower volume ranges since the economies of scale relate to the cost of developing and marketing (primarily labor intensive) and the level of general customer acceptance.

Thus, software sales have much smaller fixed costs to absorb and require far less volume to recover the invested cost.

The table on profitability shows that a small company (MDSI) can be very profitable if it can develop a sufficiently specialized market position so that it can establish a dominant market share position and, thus, be at a distinct cost advantage to any would-be competitor. MDSI has done this with their computer-aided design and computer-aided manufacturing on-line services to machine tool users.

As will become obvious, the factors which will determine future growth and success in this industry relate to company size, the market sector orientation of each company, the breadth of hardware services offered (batch, on-line, minicomputer sales, etc.) and the system's knowledge and the ability to deliver application efficient and cost effective solutions. Such industry applications sophistication places the vendor in a position to be needed by the customer, not merely the commodity seller of computer time.

THE GROWTH COMPONENTS - A Sub-Market Appraisal

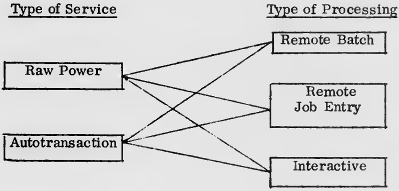
As highlighted in Table #1 earlier, the data services industry can be broken into three groupings based on growth potential. Rapid growth (those sectors with projected revenue growth greater than 15% per annum), medium growth (sectors with 10 - 15% per annum growth)and slower growth sectors (less than 10% projected per annum).

REMOTE COMPUTING SERVICES (RAPID GROWTH)

Remote computing means simply the bringing of computer processing capability to the user through a communications link and a terminal, thus, giving the user access without the need for an on-premises computer. The computer center in fact may be hundreds, even thousands, of miles away.

Most market research houses that have analyzed prospects for industry growth have projected remote processing services to increase at a faster rate than any other market sector. While growth projections may vary widely in this sector, as shown previously, the market is projected to grow by anywhere from 19 - 30% per annum between 1975 - 1980 depending on the source.

Remote computing can be looked at in two ways: (1) the type of services offered to the customer and (2) the mode in which the terminal interacts with the computer center and the type of processing actually performed. These dual-purpose capability options are diagramed below:



NOTE: A definition of each of these is given in the terminology section in Appendix A.

Types of Services

The differentiation of "raw power" versus "autotransaction" is primarily one of the breadth and type of services offered the user. If the user is using the information network system or time-sharing system primarily to facilitate his general data processing through his distributed national organization, or is using his own software, the network is being used primarily as a computer resource or for its "raw power" processing capabilities.

In "raw power" uses, the information network is used by the customer to process his programs and to meet his specific needs. The customer usually uses his own data base and software but uses the network for computer processing, communication and information handling. Thus, a national data network like Computer Sciences' Infonet, or Tymshare's Tymnet, meets the needs of distributed processing applications. Thus, a major company headquartered in Chicago or any other city can communicate and transfer data to each of its divisions or marketing offices throughout the country by the use of the independent network. Such systems can be effectively used for order entry, information status reporting, field office inquiry, etc. As projected in Table #1 earlier in this report, "raw power" information service revenues are expected to grow at a 25% annual rate between 1975 - 1980 according to the projections of the International Data Corporation.

Some users not only want the flexibility of a network system to facilitate processing but also may require specialized industry application software from the service vendor or may subscribe to a proprietary data base of information which the vendor makes available. In such "autotransaction" services, the data service company is offering more than access to and use of an information network on a time-sharing basis.

In Autotransaction services the specific data service is normally based on highly specialized industry application knowledge or for an established data base which is unique. For instance, in the automobile dealer market, Automatic Data Processing and The Reynolds and Reynolds Company both offer complete applications systems for accounting, inventory control and miscellaneous services through either a regional computer network or an inhouse minicomputer. Other prominent companies such as Tymshare, Computer Sciences, Control Data and G. E. have also developed their own applications market specialities.

Long term, propriatery data base systems could be the fastest growing portion of the data services industry. Some examples of proprietary data base services are Autex's system for displaying trading blocks for purchase or sale by brokerage firms, Compustat's financial information file on hundreds of companies and TRW's credit information file services. It can be expected that as companies strive for industry application specialization and dominance, they will also push to expand such services with proprietary data bases which can also be sold to those same industry customers and, thus, leverage the scope and magnitude of the revenues generated per customer.

It is the repetitive nature of the remote autotransaction business, plus the ability to differentiate services and provide high value added which offers the strong attraction of the market. Autotransaction type revenues have been forecast by I. D. C. to grow by close to 35% per annum between 1975 - 1980 as noted earlier.

Delivering Remote Services

Remote computing is the providing of computer services to the customer through a terminal entry device normally on the customer's premises. The actual processing of a terminal entered request can be executed either immediately or deferred for processing at "off hours" when processing time costs are less. On-line access with processing immediate is called "interactive processing"(normally on a time-sharing basis), while deferred processing is referred to as either "remote batch" or "remote job entry".

Remote computing is normally provided the user through a time-sharing system which can either be local in nature or a national information network. Time-sharing systems consist of centralized computer centers servicing a network of cities over telephone lines, or sometimes via communications satellite, particularly when foreign networks are tied in. Most time-sharing networks rely on a centralized computer site to optimize the use of processing hardware. Virtually, all time-sharing networks use minicomputers throughout the system to prepare data into a standard format and to control and optimize the most efficient communications path through the network to facilitate the most efficient data interchange with customers. The information network type of time-sharing system has the strength of being able to access the system at any terminal point and readily transfer data via phone lines or satellites on a national or international basis. The major information network service companies are General Electric's Information Services Division, Control Data's Call 370 and Cybernet Systems, Computer Sciences Infonet and Tymshare's Tymnet operation and that of McDonnell-Douglas Automation. Each of these systems costs tens of millions of dollars to develop and install and are now major revenue producing assets. These network companies offer time-sharing on both the "raw power" basis and "remote autotransaction" basis. However, these networks also allow, in most cases, the user to request processing in either an on-line interactive mode or a remote batch mode.

Many industry experts believe that the long term trend in Network Information Services is away from traditional time sharing and toward remote batch operations. It is estimated that users currently spend about 35% of their remote computing dollars for remote batch with the balance spent for on-line inquiry and conversational applications. By 1980 remote batch may exceed 60% of total remote service revenues as Electronic Funds Transfer Systems evolve in the banking industry and on-line Point-of-Sale Systems expand through the retail industry. Additionally, the use of remote batch services for many users is more cost effective when immediate response is not critical.

The use of regional time sharing where minicomputers are set up in specific cities and are designed and programmed to service a specific industry in a geographical area with time-sharing services is an example of what is expected to be one of the fastest growing sectors of the data services industry. An example of this is Automatic Data Processing and Reynolds and Reynolds' strides in setting up minicomputer based, time-sharing systems to service the Dealer Services market (automobile, truck, farm equipment dealers). This type of time-sharing differs in that the services are oriented more toward support of a specific industry specialty. In the dealer market, Automatic and Reynolds provide general ledger accounting, inventory management and control, management information reporting systems, cost analysis, etc. The key to this type of application-oriented setup is that the customer depends on the supplier not only for computer time, but for application software and system support (training, maintenance, et al and also for the maintenance of the customer data base for inventories, et al). This type of on-line service is another type of "remote autotransaction" but done on a regional or local time-sharing basis and using minicomputers with highly dedicated industry application systems to maximize response, application expertise and the ability to provide data base management systems.

What do customers look for from time-sharing companies? According to a recent Data Pro Research Survey, customer opinions surveyed included: Time-sharing systems cost effectiveness, response time, reliability, ease of use, quality of technical support, quality of sales personnel and the effectiveness of training aids and, lastly, overall satisfaction. The compilation rating based on a rating system of 4 points for excellent, 3 points for good, 2 points for fair, and 1 point for poor revealed the following composite ratings for time-sharing companies:

TABLE #5
Users' Ratings of Remote Computing Services#

Companies	No. of User* Replies	Weighted Avg. Rating
The Service Bureau Co. (Control Data)	80	3.07
Cyphernetics (ADP)	31	3.05
Computer Sciences Corp.	40	3.02
General Electric	134	3.00
Tymshare	46	2.96
Control Data (Cybernet)	21	2.92
National CSS	36	2.92
Comshare	23	2.85
Boeing	19	2.75
Rapidata	15	2.70

#Source: DATA Pro Research Corporation's 1976 Users' Survey.
*List is limited to companies with 15 or more user replies.

The key to success in providing remote services is still solving problems or providing information in a useable form so management can determine such things as: customer account status, order status, inventories and accounts receivable control and analysis, equipment status, sales and cost analysis data, etc. This type of information can be provided instantaneously through the customer terminal to check on an account, an order, an inventory level or a product cost. Thus, to the degree such services allow the customer to manage his business, his capital and his people better, they can be highly cost-effective services. To the degree companies specialize by industry, they improve their chances of being the prime source of application intelligence for that customer segment and, thus, enhance the customer's dependence on them as a prime industry solution-service vendor. This user dependence promotes a more stable customer base, insures more value added, makes it easy to add additional industry users and provides profit leverage as additional business is added with little incremental attendant costs. Of the companies which get the majority of their total revenues from data services, those companies which are expected to benefit most from the growth of remote computing services envisioned are: Computer Sciences Corporation, Automatic Data Processing, National CSS, Tymshare, Reynolds and Reynolds and Manufacturing Data Systems, Inc.

Software and Systems Services - The Key to Successful Processing Growth and Profitability. The easiest way for a company to differentiate its processing capability is through its level of application sophistication. Success depends on the degree that software better allows the customer to solve his basic questions in accounting, data base management and analysis, financial statement preparation, forecasting and other special analytical problem solving areas. Software is the industry's "intelligence", its value added to the basic remote or batch processing services. Processing without effective software is a bulk commodity previously described as "raw power". The customer doesn't become dependent on a supplier for raw power only. However, he can become very dependent on a company which provides him a total system service package which is highly oriented to solving the user's specific problems and needs. The quality of software is critical, but to maximize its effectiveness the company should also provide the other services necessary to address the customer with a system-oriented solution. These other capabilities are processing (batch, remote entry or interactive services) plus service support and occasionally ancillary services such as user education, operating system enhancements, terminal sales and leases, etc. While software quality and breadth ranks at the top in importance, a total solution and service approach best addresses and ties the customer to the service vendor.

Software is of two types: contract software and proprietary software. Contract software is that software developed on a custom basis to solve the specific needs of one customer. This type of software development is consulting-oriented and is normally done for very complicated systems, i.e., problems for the government particularly for the military, new transportation systems, for communication systems, etc. The custom contract market is not where the processing service companies are placing their software development efforts; custom software development infrequently has industry wide applicability.

Proprietary software development is where the emphasis is. This entails the development of an integrated set of application software which is often specialized by market or application type (payroll, accounts receivable, general ledger accounting, etc.) and which is systematically upgraded and expanded at regular intervals by adding supplementary modules to primary software. Such proprietary software is more and more being developed along industry specialized lines so that the service companies can better address that industry's problems, needs and system requirements, and better develop cost effective problem-solving software. To the degree that companies specialize by industry (i.e. Automatic Data's broker services, Reynolds and Reynolds dealer services, Tymshare's tax preparation and processing services, etc.), they improve their chances of being the prime source of application intelligence for that customer segment and this enhances the probabilities of making that industry's users more dependent on the service company as a prime problem solver. Such industry specialization also improves the ability to address individual user problems on a total system basis which is so important in providing a broad range of application services.

As illustrated earlier in Table #1, total software support services are expected to grow by 18% per annum from 1975 - 1980 by Quantum Services and by 24% per annum by I. D. C. According to I. D. C, the "packaged" portion is expected to grow at close to 30% per annum while custom more like 20% annually. Data service companies are not only competing among themselves but with both mainframe and minicomputer manufacturers and are also offering a total systems approach to handling the customer data processing requirements through either the sale or lease of an inhouse computer system. Thus, to compete successfully, the service company must provide cost-effective processing reliability and software which is both broad enough to meet most computing needs yet specific enough to deal with the needs of the targeted market segment. Thus, the future growth of data services companies specializing in remote services and network information services will depend more than anything on the level of sophistication and competitive standing of their software and systems solutions.

Facilities Management (Medium Growth)
According to Quantum Services and I. D. C. this market should grow between 11 - 15% from 1975 - 1980. F. M. includes the assumption by the service company of the full responsibility for all data processing within the client's organization including employment of operating and systems personnel and ownership of the hardware. The F. M. company is also responsible for all application packages for use on the computers and their periodic upgrading. This total systems responsibility on a contract basis has been the traditional approach to F. M. practiced by Electronic Data Systems (E. D. S.), the industry's largest, and others. However, F. M. companies are modifying basic approaches and taking a more flexible and customer-oriented approach. F. M. companies are now more willing to make software professional services, or specialized processing services, available on virtually any combination basis and to the degree desired by each client.

New concepts of facilities management are evolving because the original all-inclusive form of F. M. has not grown at the rate nor had the breadth of client acceptance envisioned outside of a few industry sectors, particularly health care reimbursement and local government accounting systems management.

F. M. services have normally been supported by long term contracts. These contracts frequently run from three to eight years in duration and add to the stability of the customer base. However, contract terminations at the end of the contract period have in recent years been a significant problem for the industry. EDS, in particular, has experienced cancellations from several state governments on MEDICARE and MEDICAID contracts. In these cases the "political decisions" were rendered for reasons other than the quality and cost-effectiveness of the service provided.

Prospective customers now have more alternatives to F. M. They can process inhouse totally or partially. If they elect partial inhouse claims processing, then they can turn to an application system specialist to supplement their efforts but not to totally manage them. In the final analysis, the customer will have to rely on the most sophisticated and most efficient system supplier whether it be EDS in Medicaid processing systems or Computer Sciences in local government accounting systems.

F.M. type concepts are being used by others but on a modified basis. Tymshare uses it for certain large customers where they will dedicate specific computer systems to support those customers' total time-sharing needs. The customer signs a contract for a minimum of two years' duration (less than is typical with traditional F.M. contract lengths) for the exclusive use of the delicate computers and supporting services. National CSS similarly offers certain of its network services to large customers on two-to-four-year contract terms and supports the processing with any combination of software, operating people, and support services desired.

The future trends in F.M. indicate that the commercial user sectors are likely to be less willing to make very long term contract commitments (five years and longer) and will generally be less willing to turn total system responsibility over to a facilities manager.

Experience to date indicates that large users are more likely to employ inhouse minicomputers or larger scale data processing systems to handle their main processing requirements and use time-sharing companies to handle supplemental processing or management-oriented information requirements. Smaller and medium-size users are more likely to rely on outside processing services for the greater portion of their needs.

If the strength of facilities management is going to continue to be largely governmental processing and programs oriented, then the question of the political decisions on contract renewals will continue to be a major uncertainty in appraising the growth and stability of the total customer base.

BATCH PROCESSING (Slower Growth)

Batch processing, or traditional data center carry-in and carry-out processing, is the largest and slowest growing segment of the data services industry. Based on Quantum Sciences figures, batch revenues were about $2.2 billion in 1975 or 38% of total industry revenues. I.D.C. figures estimate that batch revenues represented about 40% of 1975 total industry revenues. Both agree that batch revenues will only grow about 6 - 8% per annum with real growth not more than 5% over the next five years. The limits to growth of batch processing are not the absence of new customers, new applications or services, or new markets to penetrate but the inroads of the more flexible and more timely remote computing services.

As a result of software technology advances, interactive transaction-driven systems are replacing previous batch processing. As on-line systems, data base management and teleprocessing evolve throughout the user base, traditional processing services are bound to slow and eventually decline.

According to I.D.C. figures, batch services accounted for approximately 60% of all 1974 U.S. processing revenues, around 50% of all 1976 U.S. processing revenues, and are projected to decline to approximately 35% of all 1980 processing revenues. In contrast, they forecast remote access services to grow at a 30% rate between 1975 - 1980.

Automatic Data Processing, "the king of batch", indicates that their market studies indicate that they do 20% of the payroll processing around their Clifton, New Jersey center but only about 3% of the market in all other processing centers. It is their goal to dominate batch processing in every market to a degree at least as successful as the Clifton Center. At the same time, they are intensifying their efforts in other dedicated information services (DIS) such as dealer services, financial data services for the brokerage and investment management industries, in real estate management and in banking and thrift services. ADP sees the opportunity to dominate batch services to a degree far greater than they do today. Their numerous data centers, strong national marketing, aggressive expansion, high cash flow generation and recognized expertise in basic application software gives them considerable momentum in both their Commercial Services Group (payroll, accounts receivable, general ledger, accounts payable) and also in their Special Industry Services.

No matter how successful a company is or how strong it feels its growth opportunities are in these areas of past success, a smart management must exercise judgment and forethought and be prepared to give the customer all the mediums of processing that they may require. As a result, ADP has network services which meet their customers' on-line interactive requirements, also offer minicomputer based regional on-line systems for automobile dealers and somewhat less successful ADP Autonet for customers in the wholesale distribution of wine and spirits and for health care industry's remote access services.

Batch services will continue to be a source of strong profitability as well as a service to migrate entry level customers to higher value on-line remote services. It also provides an important element in ADP's portfolio of processing services. As market researchers adjudge market growth, ADP and others must base their ability to grow faster than the market through market share penetration and show even stronger profit momentum through careful cost analysis, improved facilities utilization and pricing. Also, as the market slows,more small companies are likely to abandon the market or become absorbed by the broader service and full system suppliers. Many companies' plans call for continued expansion in the batch service segment by such acquisitions where appropriate along industry specialty lines. Among the most aggressive in this regard have been Automatic Data Processing and Tymshare.

COMPETITIVE CHALLENGES, RISKS AND BARRIERS TO GROWTH

No discussion of the opportunities of future growth can be placed in the proper perspective without a clear view of the problems and barriers to such growth and what will be required to best position a company to overcome such hazards.

The major competitive challenges for the data services industry can best be outlined as follows:

(1) There is an increasing challenge from major computer system manufacturers such as IBM, Burroughs, NCR, etc. to increase their offering of small scale, easy-to-operate, general purpose minicomputer systems to both sophisticated, large users and to unsophisticated new users. Such offerings as the IBM System/32 and the Burroughs B-80 can be purchased for prices less than $25,000 with supporting software and peripherals. New designs in semiconductor technology and architectural system improvements will result in additional systems at even lower prices in the future.

(2) Minicomputer manufacturers, such as Hewlett Packard, Digital Equipment, Data General, etc. are offering minicomputers tailored to specific applications and solutions. These minicomputer suppliers are making major efforts in meeting the rapidly growing, distributed processing market's demand for remote free standing processing capabilities. To the degree that such "mini's" become cost effective as part of an inhouse distributed processing system, much of the benefit of a raw power information network is lost.

(3) There is always the continuing threat of major non-data processing companies with substantial inhouse investments in data processing systems and under-utilized capacity offering such capability to others on a data services basis. For example, Ford is offering its dealer services to its independent Ford auto dealers in competition with Automatic Data Processing and Reynolds and Reynolds. This selling of excess capabilities is how such companies as McDonnell-Douglas and Boeing got into the data services industry. However, for these companies to succeed, they must provide not just excess capacity but competitive applications and system services on an industry specialized basis or face a competitive disadvantage. Nonetheless, such competition can hurt those independent data service suppliers which lack a leading edge in industry solution services.

(4) Under an agreement with Control Data upon IBM's sale of its Service Bureau Corporation in January, 1973, IBM is precluded from re-entering the data service industry before January, 1979. The question that will persist is what happens in 1979? Given the attractiveness of this sector of the market, particularly in network services and remote time sharing, IBM may well elect to put its considerable inhouse systems capability, application expertise and substantial cash flow to use.

The Minicomputer Threat

The basic long term trend in computer design is that, given the increased miniaturization of functions and memory and the sharply declining cost per function and per memory bit, smaller minicomputer configurations and prices are possible. What IBM, Burroughs and NCR offer that minicomputer manufacturers, like Digital Equipment and Data General, don't have is support and service organizations geared to each and every user who might want a small computer system.

The pure minicomputer, as now designed, is sold as a tool not as a system solution. While "mini's" are not expected to replace large scale computer systems, they are expected to increase in use in distributed and transaction processing applications and provide a growing option for the corporate user.

The IBM System/32 is probably most representative of the new minicomputer system oriented for the first-time user. The System/32 is a full-fledged computer system with CPU, memory disk, display terminals and printers all housed in a single desk-sized unit. It is supported by a broad range of application programs for numerous markets and functional users. This is expected to be the largest selling computer ever introduced. Industry sources estimate 60,000 - 70,000 systems will be installed by 1980. By contrast, at the end of 1975 there were about 72,000 general purpose computers in use. The System/32 is available on a rental basis for under $1,000 a month. Other minicomputers such as the IBM 5100, the Wang 2200 and the Hewlett Packard 9830 and others are available for outright sale at prices ranging from $4,000 to $10,000. Within five years, given cost trends in microcircuitry, similar microcomputers will be available for as little as $1,000, maybe less.

IBM's marketing of small systems is emphasizing the selling of solutions. They are offering highly microprogrammed systems that provide ease of customer use and which can easily document operational savings to the customer. It can be expected that IBM, Burroughs, et al will continue to emphasize and enhance their software and system offerings to insure maintaining customers who might elect to leave the EDP supplier for a service vendor.

The future hardware trends in computer design will continue to employ greater use of microprocessors, micro-programming, MOS memories which will allow EDP system manufacturers to increase the capability of such systems more effectively toward smaller application markets (i.e., distributors, small retailers, wholesalers, specialty manufacturers, etc.). This should increase the ability of the minicomputer system manufacturers to be more solution-effective across a broader industry application spectrum. The service companies must meet this competition by offering better software and system enhancements while adapting to any hardware changes the mainframe and minicomputer manufacturers might introduce. This could result in a technological squeeze on the data service companies as IBM and others shift gears on new system introductions.

The only way for the service companies to avoid playing catch-up with the mainframe manufacturers (offering their customers the latest generation hardware) is to make their customers dependent on them for solutions, not specific computer offerings. Computer technology is likely to be most critical in those cases where a customer is considering going inhouse with his own system. In such cases, the data service company can still salvage the software and systems support if the customer views the service company as a superior solutions provider versus the mainframe vendor.

Service bureaus are beginning to exercise their options by:

(1) Installing intelligent terminals at customers' sites.

(2) Installing on a lease or sale basis stand-alone minicomputers on customer premises and contracting for the software and service support.

(3) Turning specific industry expertise into marketable software packages for use on hardware sold by the service company.

(4) Acquiring other bureaus and consolidating them, thus, gaining critical mass by adding customers and increasing efficiency through duplicate cost eliminations.

THE IBM THREAT

IBM is in the process of launching its Satellite Business Systems (SBS) operation. First tests are scheduled to begin early this year and IBM hopes to begin communication service in 1979 to the general business data processing community. SBS is expected to sell transmission capacity to service bureaus as well as corporate clients. However, many industry services feel IBM could well elect to use a portion of SBS's transmission capacity to launch its own data services network transmission system.

The other side of the IBM equation, since they have the capital, system know-how, minicomputer technology, manpower and, eventually, a proprietary communication transmission system, is what will be the self-impact on sales and rentals of IBM computers? To what degree would the costly establishment of a national data network in competition with General Electric, Control Data, et al, have on reducing customer demand to upgrade existing inhouse systems to newer IBM hardware or even to let older and now highly profitable leases for IBM computers expire and convert to a service contract? While most large EDP companies would use a data network to supplement existing inhouse computing, small customers might more and more view it as a viable alternative to the maintenance of inhouse systems. The release of IBM's next computer generation, whether in 1979 or 1981, will result in considerable rental base churning which will dampen growth without sufficiently strong outright sales. If the re-establishment of a service bureau capability results in a considerable exodus of current older lease customers, or potential new generation purchasers, the results on IBM profitability could be quite unsatisfactory for a time, particularly if it restricts to a greater-than-normal degree the rate of outright sales of a new generation of computers.

Thus, while the launching of a transmission utility can add largely incremental revenues and earnings on invested capital, the same may not be true of a data information network where offsetting impacts on IBM's computer business could be considerable. Additionally, IBM still has a Justice Department suit outstanding which alleges monoplistic practices detrimental to competition which adds a legal dimension to IBM's ability to re-enter the data services industry. This consideration is particularly critical in the aftermath of the establishment of a communications utility such as SBS. Therefore, while we recognize the possibility of IBM's re-entry into the data services industry, it appears highly uncertain and, maybe unlikely, that IBM will elect to re-enter this market.

OUTLOOK - Company Comparisons

The growth opportunities of the numerous competitors vary as do their markets, resources, management and strategic plans. The ideal is for a company to be in the fastest growing markets, to have a leadership position in each, have a high return on assets employed and be able to invest sufficiently in computer systems and in R & D for systems and development to continue to increase that application dominance and service steadily while having the most effective marketing to realize strong additions to one's customer base.

No company is the so-called "ideal". However, an examination of what markets each is in, how fast they're growing, and what percent of total revenues is derived from each is helpful in comparing revenue growth opportunities. Secondly, a comparison of the growth in the computer capital account shows the rate of direct investment in the expansion of computer services, or of upgrading the type of services offered. Thirdly, the rate of research and development expenditures shows the relative company emphasis in providing stronger computer system services and application software to better address and solve customer problems.

Industry Sector Revenue Analysis

Being where the "action is" is part of the opportunity for rapid growth. Of course, this must be tied together with reliable and convenient computer services and high quality software. The following table shows only what portion of each company's revenues fall into each of the sub-industry categories. This table is used as a profile to growth potential and a comparison of the general revenue structures of each and not a specific projection of any company's five-year revenue growth.

TABLE #6
Computer Services & Software
Company Revenue Profile Comparisons

	Est. 5-Yr.	% of Total Company Revenues #							
Major Markets	Growth *	ADP	BRD	CSC	EDS	MDSY	NCS	REYNA	TSHR
Batch Processing	7%	84	79**	-0-	-0-	-0-	6	25	26
Remote Computing									
Auto Transaction	30	10		14	-0-	76	35	12	50
Raw Power	20	3		8	-0-	-0-	53	-0-	4
Facilities Management	13	-0-	-0-	20	95	-0-	2	-0-	5
Software & System Support	21	-0-	20	38***	5	18	3	-0-	10
Other - Non-Data Services	-0-	3	1	20***	-0-	6	1	63	5
		100%	100%	100%	100%	100%	100%	100%	100%

# Based on last fiscal year end.

* Average of the growth sector forecast of Quantum Services and I. D. C.

** A major portion is largely clerical.

*** This is an approximate breakdown of CSC's system development and communication engineering groups which total 58% of total revenues to isolate the non-software and data systems support services.

	ADP	BRD	CSC	EDS	MDSY	NCS	REYNA	TSHR
Weighted Avg. Growth of Composite Data Service Markets *	10%	10%	20%	13%	28%	23%	14%	21%

* Obtained by multiplying the percent of each company's business by the growth projections of the markets and taking a weighted average.

Warning: Individual markets and services within sub-markets may grow at sharply differing rates.

OUTLOOK - Company Comparisons

As the weighted average growth numbers indicate, the companies doing 75% or more of their total business in data services and those whose market orientation would give you the best potential for 20% revenue growth are: Computer Sciences, Manufacturing Data Systems, National C S S and Tymshare (See company write-ups which follow for more details on each). The balance of the companies fall in the 10 - 15% growth area. However, this potential revenue growth can be deceiving. For instance, over the last five years (through 6/30/76), Automatic Data Processing has realized 27% compound revenue growth and 56% compounded earnings per share growth due to steadily increasing its market share in batch processing services and turning the volume added into incrementally higher profitability through economies of scale and strong productivity gains. Also a program of numerous acquisitions have been consummated and turned into highly profitable incremental earnings. As shown in Appendix B, Statistical Company Comparisons, the only companies over the last five years to grow faster than their markets and improved profitability rates while doing so were: Automatic Data Processing, Manufacturing Data Systems, National C S S and Tymshare.

Computer Capital Investment - A View of Future Growth Capability?

If a data service company has invested considerable amounts of capital in recent years to provide the latest in up-to-date computer systems, it is better able to offer its customers a higher quality of service or to offer processing capabilities in new areas and to new customers in existing markets.

The following table shows the current rate at which the computer account is depreciated (the lower rate of accumulated depreciation means the computers are on an average newer). A newer computer base offers more capability per dollar of cost and is less subject to needed replacement or upgrading. Obviously, companies anxious to increase market penetration, open new data centers, or expand data networks are going to be more aggressive in expanding their computer bases. It is these companies which are taking the steps now to improve their service capability and future growth prospects.

TABLE #7

Analysis of Computer Equipment Capital Account#

		Current Account Status (000 Omitted)			Recent Trends in Computer Acct. Additions		
Companies	Fiscal Yr. Ending	Gross Value	Accum. Deprec.	% Depreciated	1974	1975	1976
Automatic Data	6/30/76	$41,983.0*	$16,193.0	38.6%	+33.8%	+30.2%	+37.5%
Bradford Nat'l.	12/31/75	1,075.0	362.0	33.7	+173.2	+23.5	NA
Computer Services	4/2/76	79,726.0	47,106.0	59.1	+5.1	+5.3	+7.1
E.D.S.	6/30/76	29,329.0	8,581.0	29.3	+19.0	+5.7	+1.6
M.D.S.I.	8/31/76	E 250.0	E 25.0	10.0	NA	+82.2***	193.6***
National C S S	2/29/76	5,582.0**	2,606.0	46.7	+18.2	+27.9##	NA
Reyna & Reyna.	9/30/76	20,510.0	8,359.0	40.8	NA	+37.1	+35.3
Tymshare	12/31/75	21,471.0	10,235.0	47.7	+17.4	+44.0	NA

These figures exclude the value of computer equipment on lease which for most of the above companies represents additional revenue-producing computer assets.
* Includes data processing equipment, office and delivery equipment.
** Includes computer equipment, furniture & fixtures.
*** Includes computers and furniture
Year ends February 28th of following year.

OUTLOOK - Company Comparisons Cont'd.

As shown on the preceding page, Computer Sciences, Automatic Data Processing, E.D.S. and Tymshare have the largest computer capability owned (this excludes computer leases). The question is how up-to-date are those accounts? Based on the percent depreciated, M.D.S.I. and E.D.S. appear to have the most modern computer plants, allowing for variations in depreciation methods. The rate of growth shows vividly each company's commitment to expand its processing capability and in recent years Automatic Data Processing Bradford National, MDSI, National C.S.S., Reynolds and Reynolds, and Tymshare have all increased at better than 20% per annum average rates. Given the relatively large size of Automatic Data's, Reynolds and Reynolds' and Tymshare's computer investment, their additional commitments are particularly impressive. Automatic has been aggressive in its commitments to expanding its Cyphernetics capability, increasing its batch processing capability into new market and expanding its commitments to minicomputers for resale to customers desiring inhouse systems. Tymshare has been continuing its expansion of Tymnet. Two newer but rapidly growing forces are MDSI and Reynolds and Reynolds, both intending to dominate their respective markets of on-line computer-aided manufacturing and design services for the machine tool industry (MDSI) and regional time sharing for dealers (Reynolds).

It is generally true that companies with the most aggressive investment in new computer capability have depressed recent earnings as they've financed and added underutilized capability. However, it is these same companies (i.e. - Automatic Data Processing, Bradford National, MDSI, National CSS, Reynolds and Reynolds and Tymshare) that have the opportunity to turn this investment into new market opportunities, new customers and improved utilization of the computer systems as well as better absorption of overhead. These are the companies investing vigorously in their future.

Research and Development - Outlays for System Development and Programming Cost

Since solving the customer's problems in a cost effective manner is the critical factor in determining the degree of success to be achieved, the R & D outlays are of key importance in maintaining or achieving the competitive edge. The rate of growth of R & D expenses and the percentage of the sales dollar committed shows the degree of company commitment to this area as a top management spending priority.

TABLE #8
Research & Development Expenditures
(Outlays for Systems Development and Programming Costs)

Companies	Year's Ending	Latest Yr.'s R&D Expense#	Tot. Revenues	3-Yr. Grw.* in R & D
Automatic Data	6/30/76	$5,327.0	2.8%	7%
Bradford National	12/31/75	587.0	0.9	22
Computer Sciences	4/2/76	3,029.0	1.4	NA
E.D.S.	6/30/76	7,500.0E	5.8	5
M.D.S.I.	8/31/76	855.0	5.2	53
National C.S.S.	2/29/76	2,348.0	6.6	16
Reynolds & Reynolds	9/30/76	647.0	0.7	3
Tymshare	12/31/76	2,397.0	4.2	26

# Dollars in Thousands
* Compounded Annual Growth

OUTLOOK - Company Comparisons Cont'd.
The companies which stand out as to their level of R & D spending and the three-year growth of such spending are MDSI, National CSS and Tymshare. All of the aforementioned are spending over 4% of revenues on system development and programming and increasing such expenditures by better than 15% per annum. Bradford has increased its expenditures by 22% per annum over the last three years but its level of expenditures is still very small. Of course, the level of such expenditures depends on the breadth of markets and applications served, the level of competition and management's aggressiveness in entering new areas. Thus, companies such as Reynolds and Reynolds and MDSI which are focusing virtually all their R & D efforts in one market area and are already well established would seemingly need to spend less than Tymshare which is aggressively pursuing several markets.

Based on the comparison of three factors, (1), orientation of company business to the growth market sectors; (2), recent aggressiveness in expanding owned computer capability; and (3), recent rate of expansion and related level of the revenue dollar spent on system development, the following company profiles are generated:

COMPOSITE COMPANY COMPARISONS
Arranged By Latest Returns on Total Capital

Companies	Last 5-Yr. Rev. GRW#	Net Return On Average Total Capital		Est. Composite Growth Rates of Service Markets*	Data Serv. % of Total Revenues	Investment ** Relative Rankings for Computers	R & D
Automatic Data	27.2%	19.0%	(6/76)	10%	97%	2nd	5th
Bradford National	42.6	9.7%	(12/75)	10	97	4th	7th
Computer Sciences	17.7	10.6%	(3/76)	20	80	8th	6th
E.D.S.	12.0	18.3%	(6/76)	13	100	7th	3rd
MDSI	75.8	26.8%	(8/76)	28	94	1st***	2nd
National CSS	35.5	22.3%	(2/76)	23	99	6th	1st
Reynolds & Reynolds	13.1	14.2%	(9/76)	14	37	3rd	8th
Tymshare	40.7	22.6%	(12/75)	21	95	5th	4th

# Compound annual growth.
* A weighted average of the estimated future growth rates of the data services markets in which the various segments of the company's revenue are generated.
**Arrayed by ranking the recent growth of computer asset accounts and the percentage of the sales dollar spent on R & D as well as the absolute rates of said yearly expenditures.
***From a very small base.

Taking all factors into consideration the best long term fundamental positions among the predominant data service companies (which excludes Reynolds and Reynolds) would appear to be Automatic Data Processing, Manufacturing Data Systems, Inc., National C S S and Tymshare with Computer Sciences meriting interest for its recently improving condition. All of these companies are heavily oriented to the faster growing market sectors (except Automatic), are aggressive in expanding their commitments to computer systems and also for systems and applications development (except most recently Computer Sciences) and are generating strong returns on total capital currently (again except Computer Sciences). As Automatic's record shows, it has grown far faster than its markets because it is in most cases the best at the data services it delivers and, thus, continues to capture market share. Also as noted previously, ADP is aggressive in making acquisitions, adding new systems and service territories; therefore, when its record of 27 years of uninterrupted earnings growth is considered, it must be viewed as the "Cadillac" of the industry. Computer Sciences has a low return on total capital, has a heavily debt laden capital structure and has not been as aggressive in expanding its computer facility and research outlays as some, it is nonetheless achieving sharp gains in margins and rapid growth in its Infonet network information system. Thus, the future performance of each company is ultimately a function of meeting the market's needs in a cost effective and profitable manner and each management team must set its own game plan to accomplish this. As shown in Appendix B, those that have performed best in the past have been Automatic Data, Manufacturing Data Systems, National C S S and Tymshare. The following writeups highlight the companies and the best current investment vehicles to reap tomorrow's rewards.

NOTE: No attempt was made to analyze the proposed "Bell Bill", the Consumers' Communications Reform Act of 1977. This bill among its many facets is intended to limit and increase control of interconnect companies (those non-Bell equipment suppliers) who tie into the Bell System. Several companies are offering alternative transmission services to the Bell System and other interconnect companies are offering switching systems that tie into Bell lines. This legislation carries with it the possibility of state control of interconnect companies that tie into the Bell System. This would complicate substantially the operations of data service companies if they, in fact, had to deal with fifty different state requirements in order to conduct their normal service operations. Since this legislation is very involved and the outcome uncertain, no more than this reference will be pursued at this time. However, it should be recognized as an operational negative to the data service industry if the legislation restricts their ease and flexibility of using common carrier lines.

AUTOMATIC DATA PROCESSING INC. (AUD)

	1976-77	Earnings Per Share			Price/Earnings		Ind.		
Price	Range	1975*	1976A	1977E	1976A	1977E	Div.	Yield	Shares (000)
$ 24	$36-$23	(1)$0.99	$1.27R	$1.60	18.9x	15.0x	0.24	1.0%	14,384
		(2) 0.96	1.23R	1.55	19.5x	15.5x			

* Adjusted for 2 for 1 split in June, 1976; fiscal year ends June 30
(1) Primary earnings
(2) Fully diluted earnings
R Restated for poolings
NOTE: See Appendix B for financials and operating comparisons

A company with twenty seven years of uninterrupted growth in a highly competitive industry must do a lot of things right. Automatic's strength is its ability to provide basic commercial services such as payroll processing, accounts receivable and payable processing and general ledger accounting more efficiently, reliably and cheaper than most companies can do it themselves. Automatic has also established positions of preeminence in providing broad systems solutions to customers in specialized industries such as: automotive dealers, brokerage and financial services, banking and savings and loan services, real estate property management, hospitals and nursing home services. Automatic's secret in industry services is they emphasize the development of top quality software solutions delivered to the customer in the mode of processing the customer desires.

Automatic offers commercial services primarily on a batch basis but on-line payroll processing is also available. ADP's Special Industry Services are offered on a multi-processing medium basis including: batch processing through ADP data centers, regional time sharing for dealers (consisting as of September 30 of 26 minicomputers in 16 cities processing over 200 customer systems), ADP Autonet an on-line systems serving wholesalers of wine and spirits, the health care industry and more recently, minicomputer based systems for inhouse customer use. ADP has also been offering Microdata minicomputers with 32K of memory to large auto dealers for about $85,000 on average. As of December 31, ADP had sold and installed 55 of these Microdata minicomputers on dealer sites. ADP recently started to offer a small Microdata system of 16K of memory worth about $40,000 on a lease only basis. These leases are on 2, 3 and 5 year terms and according to management will recover hardware, financing and installation costs in about thirteen months on a two year lease, in fifteen months on a three year lease and in about twenty months rental on a five year lease. The lease program is new and the first placement on this basis is expected shortly.

It is the tremendous breadth of services offered as well as the flexibility to give the customer the type of processing desired with a high degree of reliability that has built a franchise unmatched in the industry. Strong management, strong internal systems development capabilities, a careful ear to the needs of their customers and an active and extremely successful acquisition record have built a record of rapid and consistent growth.

Automatic is often referred to as the "King of Batch", as it dominates basic applications services (payroll, accounts receivable , general ledger accounting and accounts payable) nationally to a degree many times greater than its nearest competitor.

Automatic's business in the year ended June 30, 1976 broke down as follows:

REVENUE BREAKDOWN BY TYPE OF SERVICE
($ in Millions)

GROUP	Est. FY '76 Revenues	% of Total	Type of Services or Market Served
COMMERCIAL SERVICES	$ 95.0	49.7%	Applications oriented to: payroll, accounts receivable , etc.
SPECIAL INDUSTRY SERVICES	68.0	35.6	Servicing: dealers, financial managers and brokers, the real estate industry, bank and thrift institutions, etc.
ADP NETWORK SERVICES	22.0	11.5	Time sharing and remote batch services
PRINTING & GRAPHICS	6.0	3.2	Graphics and duplicating
TOTAL REVENUES	$ 191.0 *	100.0%	

* Adjusted for CPI pooling

Acquisitions

Supplementing internal growth with an active acquisition program has been basic to ADP's growth program. For more than three years, from July 1, 1973 through February 15, 1977, ADP has consumated seventeen (17) acquisitions, of which seven were additions to Commercial Services, seven were added to Special Industry Services and three formed the basis of ADP Network Services.

These acquisitions were important to annual revenue and earnings growth. Based on the levels of revenues generated at the time of the acquisition, these seventeen acquisitions would have added approximately $47,000,000 to revenues on an annualized basis. ADP's acquisition of Cyphernetics in June 1975 represented $16,200,000 in annual revenues when acquired. Today, these acquisitions are believed to be generating revenues in excess of $55,000,000 annually.

Due to heavy purchase activity in fiscal 1976 (the five acquisitions were all purchases), the revenue benefits through June 30, 1976 were only partially reflected in last year's results. Based on the estimated impact of the various acquisitions through last year, the Commercial Services Group realized about $8,800,000 of its $95,000,000 in revenues from acquisitions consumated between June 1973 and June 1976 with approximately $1,900,000 in additional revenues to be realized this year from fiscal 1976 purchases. (Some of this incremental revenue will be offset by less interest income earned on securities held which had to be liquidated to consumate the purchases.)

The Special Industry Group realized about $6,300,000 of its $65,000,000 in fiscal 1976 revenues from acquisitions with approximately $2,300,000 additional expected to be realized this year from last year's purchases.

The ADP Network Services Group realized all its approximately $22,000,000 in revenues last year from three acquisitions consumated in fiscal 1975 and 1976. The acquisitions last year were April 1976 purchases, thus a minimum of $4,500,000 in additional group revenues is expected to accrue to fiscal 1977 results from these acquisitions. Over the last two and a half years, eleven of thirteen acquisitions have been purchases and have had a very positive effect on year to year revenue and earnings growth.

Commercial Services

These are the traditional batch applications of payroll, accounts receivable, payables and general ledger accounting sold on an application basis without regard to customer industry orientation. Last year, 50% of total revenues were generated from such application services and a like amount to earnings. Of the group's $95,000,000 in revenues last year, approximately 70% were from payroll processing, 12-15% from accounts receivable and 15-18% split about evenly between accounts payable and general ledger accounting systems. The key to growth here is market penetration through customer additions. Total Commercial Service customers increased from 31,000 at June 30, 1975 to slightly over 34,000 as of June 30, 1976 and 38,000 plus as of December 31. Recently stronger growth is being realized in accounts receivable, accounts payable and general ledger packages since ADP started to use specialized salesmen with CPA backgrounds to sell these services. However, payroll is still ADP's bread and butter, representing about one-third of ADP's total revenues. Payroll customers increased from just over 30,000 in June, 1975 to 34,000 in June 1976 and to over 37,000 as of December 1976. Management recently stated that payroll processing is still growing at a rate faster than the overall corporate growth rate. This is due to strong growth in new customers and greater success in adding larger commercial customers. Despite lesser benefits from acquisitions, this group is still expected to see revenues advance from about $95,000,000 last year to approximately $118,000,000 this year for a 24% year to year gain.

Special Industry Services has shown very rapid growth over the last five years fostered by strong market penetration and an active acquisition program. This group consists of ADP's industry systems and consists of the following specialities listed in descending order by size: dealer services, financial data services (for brokers and portfolio managers), real estate management services, banking and thrift services and ADP Autonet--on-line services for wine distributors and the health care industry. As mentioned earlier, ADP brings its full range of processing capabilities: batch, regional on-line services and inhouse minicomputers, to customers in this market with the full support of highly specialized systems of industry accounting, inventory and financial management and data base management. In November, 1976, ADP acquired the CPI Group for 240,015 shares of stock on a "pooling" basis. CPI, a specialist in computerized administrative and custodial services, generated $3,000,000 in revenues and $900,000 in net earnings last year and added $0.01 per share on a restated basis. Aggressive acquisitions in support of the current industry specialities are expected to continue for the foreseeable future. Revenues this year aided by numerous acquisitions and strong internal growth are expected to advance from about $68,000,000 last year (adjusted for the CPI pooling) to approximately $85,000,000 this year.

ADP Network Services

ADP has entered on-line network systems over the last two years through three acquisitions: Cyphernetics (with revenues of $16,200,000 in 1975) acquired in June, 1975, Delos International (with revenues of $5,400,000 in 1975,) acquired in April 1976 and Information Sciences Inc. (revenues of approximately $500,000) also acquired in April 1976. Cyphernetics had an international teleprocessing network with a computer center in Ann Arbor, Michigan, employing some 15 PDP-10 computers and a series of PDP-8 and 11 communications concentrators to correct errors and optimize communication control in the service of over 34 U.S. cities and six European countries. The second acquisition was Delos, a London-based international network with a Princeton, New Jersey time-sharing facility serving U. S. customers. The Princeton complex is expected to be fully integrated into the Cyphernetics network. Unlike commercial services, where building the number of customers is the key to revenue growth, ADP is building the size of customer systems--increasing terminals, breadth of applications services as well as endeavoring to expand its customer base. As of June 30, 1976, ADP network services totaled over 1,200 customers and generated revenues of approximately $22,000,000. However, profitability to date is currently less than the corporate average but this is expected to change over the next few years. Management has been rapidly increasing its capital expenditures to the information network. In fiscal 1977, ADP expects to spend about $7,000,000 on its data network. These outlays are primarily for six or seven PDP-10/KLB's for the Ann Arbor Computer Center which will upgrade the current KI Series 10's now in use. Management plans to ship at least four of the older Series 10's to its London center. Thus, the main Ann Arbor center will be expanded to 17 or 18 computers with upgraded capabilities. Heavy commitments to expand and upgrade the network are expected to continue for the foreseeable future. Network Services aided by the full year benefits from last April's purchase acquisitions and internal growth described by management as above corporate averages,is expected to show the strongest year to year growth of any sector. Revenues are expected to advance from $22,000,000 to about $31,000,000, up about 40%. International expansion is getting high priority in future growth plans.

OUTLOOK

Given the combination of strong internal growth, strong cash flow, ADP is in a solid position to continue its strong acquisition program which has proven so successful in adding customers and applications expertise. ADP has the strongest franchise in the data services industry and one capable of maintaining growth of 20% per annum with roughly one-quarter (less than previously experienced) to be derived from acquisitions.

Despite a plan to increase capital expenditures from $14,200,000 last year to close to $35,000,000 this year, internal cash flow of approximately $33,000,000 and a reduction in liquid assets will support this aggressive expansion plan. No new financing is anticipated over the next year.

Management indicates broad strength in all major revenue groupings. Revenues this year (6/30) are estimated at around $235,000,000, up about 23% versus fiscal 1976 restated for poolings. Earnings per share (up 26% for six months) are expected to advance from $1.27 to $1.60 primary and from $1.23 to $1.55 fully diluted. Selling at a reasonable P/E in relation to quality, visibility and growth, the stock is viewed as the most attractive investment commitment in the data services industry today; aggressive accumulation is recommended. Additional information is available upon request.

growing at better than 15% per annum. However, as shown above, CSC's contract services revenues over the last five years grew at about a 12.4% rate and the related operating income at 20% per year over this period. Computer Sciences contract services are heavily oriented toward government systems. From March, 1972 through March, 1976, contract services showed revenue growth increasing 14.2% per annum. It is believed that facilities management revenues from municipalities paced the growth, however, CSC's government systems programs have continued to show steady growth throughout the five year period with accelerating rates and margins in recent years. The contract services portion of CSC's business is expected to show future revenue growth of 13% or better and earnings growth of at least 15%.

Infonet over the last three years inclusive of our 1977 year end estimate has realized about a 35% annual growth in service revenues and a ten fold increase in operating income. Three years ago, Infonet represented about 15% of total revenues and by the end of this year, it is expected to represent about 24% of total. If current trends continue, Infonet would equal about 30% of total revenues by 1980.

Infonet is an international network with U.S. processing centers in Los Angeles and Chicago and a third planned for later this year in Washington. Infonet consists of a communications network of land lines and satellites linking these computer centers with customers located throughout the U.S. and Europe. Minicomputers are used throughout for error correction and optimum communications routing. Management indicates that the large majority of revenues on Infonet use CSC's software and are of the autotransaction type, the balance of the users are of the raw power type. Approximately 50% of computer usage is interactive and the balance remote job entry. Computer Sciences is committed to the rapid expansion of Infonet and is continuing to expand the geographical service area, the computer processing capability and the systems and applications services offered with the system.

After a serious erosion in profitability in the contract services group in fiscal 1975 as CSC was forced to sharply mark-down lease rates on IBM 360 computer equipment, the company started a program to reduce its lease base exposure. Today, about 1½% (about $3,000,000) of total revenues are generated from computer leases and CSC is not writing any new leases but allowing the current base to shrink from natural attrition. The company plans to be largely out of the computer leasing business in the next several years and will use the Univac 1108 computers coming off lease in their rapidly expanding Infonet system. About 80% of owned IBM equipment is out on full payout leases.

CSC government programs have been oriented heavily to advanced systems development in communications, space systems, digital networks, weapons systems control, etc. Many of these programs have 20-30% rates of return on invested capital when billed on a bi-weekly or monthly basis. Such systems contracts have proved highly stable with often considerable fallout of advanced systems development projects. Last year, 57% of these contracts were performed on cost-based contracts, 11% on a time and materials basis and the balance of 32% on fixed price contracts.

INVESTMENT OUTLOOK

Contract Services reportedly have record amounts of work in process as well as a record load of work pending. As a result of increased emphasis on higher margin business and stronger reserves to better absorb overhead, CSC has shown steady profitability gains in this sector in the last two years. Infonet continues to show revenue growth of 18% or better and stronger operating income gains. Total operating income before extraordinary and non-recurring credits is expected to expand from $0.51 per share last year to about $0.80 in the year ending this March. Net income in fiscal 1977 and in the succeeding three years will benefit from about $1,000,000 ($0.07 per share) annually in ITC carry forwards. In addition, in CSC's fiscal 1977 (year ending April 1, 1977) an extraordinary credit arising from a 1972 loss carry forward will raise net earnings $3,000,000 ($0.20 per share). Next year's earnings per share are expected to increase to about $0.95-$1.00 per share. Longer term, Computer Sciences probably possesses as much or more sophisticated data systems and communications capability as anyone in the data services industry, which will continue to make CSC a major factor in the growth of this industry.

A few things that bother analysts have been the heavy debt structure and the heavy government contracts orientation. The latter is not likely to change; the former is a top management priority. Total debt has declined from $59,405,000 as of year end (4/2/76) to $54,976,000 as of December 31, 1976 with an elimination of all bank borrowings and the total debt/equity ratio has improved from 73/27% to 62/38% over this period. While the company pays no dividend and has a heavily debt laden capital structure, the company deserves investment attention in speculative accounts based on its considerable capability in both network information services and its advanced systems and software design capabilities. The company is believed capable of growing at a rate of 15% or better over the next several years. Given a sharply improving rate of return on equity and total capital, the stock has speculative long term merit.

Additional information is available on request.

ELECTRONIC DATA SYSTEMS (EDS)

Recent Price	1976-77 Range	Earnings Per Share * 1976	1977E	1978E	Price/Earnings 1977E	1978E	Div. Rate	Yield	Shares Outstanding# (000)
$ 18	$20-$12	$1.10	$1.25	$1.45	14.4x	12.4x	$0.60	3.3%	12,493

* Fiscal years end June 30 of year indicated
# Closely held - 65%

NOTE: See Appendix B for financials on a comparative basis

EDS is believed to be the largest data services company specializing in facilities management contracts. EDS specializes in designing complete EDP systems for corporate customers and then providing computers, supporting hardware, system support, service and the personnel to operate the system. This turnkey approach and industry system expertise has established EDS as the foremost producer of such services to the health care industry which generates about 45% of the total revenues, to the banking industry which provides another 25% of revenue and lastly to the life insurance industry which provides most of the balance.

Such facilities management contracts represented 94% of EDS revenues last year. EDS systems contracts normarlly run 5 to 8 years in length. Under such contracts, EDS assumes total operating responsibility for the customers' data processing requirements. EDS charges a minimum monthly fee plus increments based on transaction volume. Additional fees are charged for system designing, special programming and for installation charges. Management emphasizes that the profitability of any contract depends to a large degree on the ability of EDS to appraise accurately the future costs of providing contract services some 5 to 10 years into the future.

RECENT HISTORY SHOWS LITTLE GROWTH

As shown in Appendix B, over the last five years, EDS had the slowest growing revenues of the eight companies highlighted. It was also the slowest in EPS growth. Though several of the companies didn't have five year earnings growth, they possessed very rapid growth over the last three to four years.

The reasons for EDS's slower growth in a high growth industry environment are that facilities management contract growth has not been as fast as many analysts had earlier envisioned and contract terminations have been unusually high in recent years.

As outlined on the following page, EDS has been able to steadily expand the number of customers served and the number of systems contracts despite terminations.

Year Ending	Expirations		Status at Year End	
	No. of Contracts	% of Revenue	No. of Customers	No. of Systems
6/30/77	6	8%	NA	NA
6/30/76	9	19 *	53	60
6/30/75	5	5	50	59

* Approximately 14% of revenues ended in terminations (non-renewals)

EDS has been able to expand its customer and system contract processing base as well as its revenues through this period despite the loss of some very major and highly profitable contracts. In November, 1975, EDS lost the Blue Cross/Blue Shield of Texas health care processing contract (primarily for Medicare) worth close to $11 million and effective June 30, 1976, the Blue Cross/Blue Shield of Greater New York also terminated with a further loss of some $6 million in annualized revenues. In both cases, EDS did not have an opportunity to bid competitively to renew this business as the Blue Cross/Blue Shield in each state elected to handle Medicare inhouse with their own computers managed by their own inhouse personnel.

To EDS's great credit they have been very successful in replacing lost business with several new state contracts. In February, 1976, EDS signed a $4,500,000 systems contract with the State of Washington for Medicaid. In the fall of 1976, EDS accepted new Medicaid contracts with the states of North Carolina and Texas. The latter, worth an estimated $8 million in administration revenues annually, became effective for processing in January 1977 and replaced a good portion of the Blue Cross/Blue Shield of Texas contract lost in November 1975.

The problem, though, is that the profitability of the new business added is no where near as high as that of the old contracts lost. Lower pretax margins are normally realized on new contracts due to the heavy start-up and development costs incurred and frequent operational streamlining that must be achieved once the contract is operational.

In the six to eight year life cycle on a contract, the first year is always the least profitable with peak profits gains being generated normally in the third through fifth years. (All contracts have inflation provisions to minimize inflationary cost pressures.) Thus, the recent profitability problem experienced in fiscal 1976 when earnings per share fell from $1.21 to $1.10 and in early fiscal 1977 has been one of replacing highly profitable older business with low margin new.

Since the loss of some $17 million in annualized revenues of highly profitable business last year, EDS has steadily phased in its new business. Pretax margins are still depressed averaging about 18.2% in the first six months of this year ended December 31, 1976 versus 20.6% a year ago. New business is expected to contribute some $17 million to $18 million in additional revenues this year. The annualized potential of this business is reportedly in excess of $30 million. While earnings were up sharply in the second quarter ($0.33 versus $0.27) the improvement was primarily due to heavy flow-through of investment tax credits which pushed the tax rate down from 48.8% to 39.0%. However, revenue growth is expected to now start accelerating very rapidly as EDS brings into billings the Texas and North Carolina Medicaid contracts and a new one in Tennessee also expected for the second half of fiscal 1977. While margins are not expected to start improving before next year, at least the revenue growth outlook comparison will now start accelerating.

EDS has recently ventured into the insurance business when it signed in August 1976 the North Carolina contract to be an "insurer and administrator" of the state's Medicaid program. This was shortly followed by a similar contract to administer and underwrite the state of Texas' Medicaid program with about $240 million per annum in insurance premiums to EDS. This, in effect, puts EDS in the insurance business and opens up the risks of an underwriter. Since EDS will be acting now as both an insurance underwriter as well as processing agent, the question must persist how successfully and profitably will they run underwriting operations. EDS is establishing reserves for future claim benefit payments equal to their revenues until sufficient experience data is gathered, thus no earnings will be realized for a time. EDS intends to treat these insurance operations separately and not consolidate the results but take the earnings or losses realized into consolidated results on the equity method. Since this is EDS's first venture of this type, results could prove disappointing.

EDS also has more than its fair share of legal problems. A suit filed in July 1975 by a Trustee in Bankruptcy of Dupont Walston alleged "breach of fiduciary duties and fraud" and is seeking $45 million alleged damages and $45 million in punitive damages. A judge ruled last year that the suit should go to arbitration, the trustee appealed and the District Court of Appeals is waiting to hear the case. A similar suit filed in September 1976 by the F & M Schaefer Brewing Co. alleged negligence and breach of contract and is seeking $45 million in actual damages and $70 million in punitive damages. In both cases, EDS management claims the basis of the suits are without foundation. As the very least, such suits represent a strain and burden on management and adds to investor uncertainty and potentially could result in considerable financial liability.

INVESTMENT CONCLUSION

EDS is probably the most sophisticated facilities management systems house in the industry; however, this type of business is growing more slowly than many other segments of the data services market. The government related portion has been highly subject to contract terminations recently. Such cancellations normally result from the customer deciding to go inhouse with a computer system or electing to cancel for "political reasons". Given the uncertainty surrounding the initiation of the Medicaid insurance underwriting business, the status of legal suits outstanding and the difficulty of estimating the level of profitability of new businesses added, the stock appears fairly priced despite its improving earnings outlook. EDS is expected to earn about $1.25 per share in the year ending this June and results next year should improve to around $1.45 per share unless terminations again surface as a problem. EDS pays a $0.60 dividend and has occasionally paid large extras. Additional information available on request.

MANUFACTURING DATA SYSTEMS INC. (MDSY)

Recent Bid	1976-77 Range	Earnings Per Share# 1976A	1977E	1978E	Price/Earnings 1977E	1978E	Indicated Dividend	Shares Outstanding
								(000's)
$ 8	$10-$6	$0.64*	$0.78*	$1.00	10.3x	8.0x	-0-	2,805

#Fiscal years ending August 31

*The average shares outstanding increased 8% between fiscal 1976 and 1977 due to the public offering of 787,500 common shares of which 417,500 were newly issued in February, 1976. Shares closely held - 29%.

NOTE: See Appendix B for comparative financials and operating records.

The company is a computer service firm specializing in computer aided design (CAD) and computer aided manufacturing (CAM) services for manufacturing operations. Its principal product is COMPACT II, a proprietary computer language developed specifically for use by machine tool operators to assist in the preparation of punched tapes required for control of N/C machine tools. MDSI offers COMPACT II as an on-line time sharing service, as well as providing software and applications services for companies wishing to use their own in-house computer facilities. Basically, COMPACT II allows MDSI's manufacturing customers to get machine parts into the manufacturing cycle easier, faster, more accurately and with less labor input by bringing computer applications to the factory floor. While COMPACT II is by far the largest segment of MDSI's current business, the company has other products available today and under development which will broaden its CAD/CAM services concept and extend its efforts to assist manufacturers applying computer technology directly to the manufacturing process.

In fiscal 1976, MDSI generated revenues of $16,292,000 up 41% and net income of $1,747,000 up 46% from fiscal 1975. Fiscal 1976 revenues were generated 76% from time sharing services, 16% from software and systems support of Action Central Systems and in-house customer IBM computers and about 6% from sale of plotters and CODE--a computer based coding and classification system and 2% from other, primarily investment income. MDSI is offering their customers three levels of service: time sharing services offered by MDSI, dedicated mini-computers (Action Central Systems selling for $65,000 to $100,000) and centralized mainframe computers which MDSI supports with software and service.

MDSI's time-sharing services are provided through the use of dedicated computer time provided to MDSI by Tymshare and Comshare. MDSI has no owned computers that are operational for time sharing. It owns four minicomputers; one is used as a demonstrator and three are used in research and development. Thus, largely due to its small computer investment, MDSI has one of the smallest computer investment per thousand dollars of revenues in the industry. Management is considering the possible future purchase of a PDP-10 or equivalent system for in-house use. MDSI has a very strong capital structure with no long term borrowings. With in excess of $3,000,000 in cash and strong cash flow, no outside financings are planned.

MDSI's value added is the delivery of the time sharing services to customers through a user owned terminal and using MDSI's Compact II programming language and MDSI's developed proprietary software "links" which are used to tie the Compact II program processor to the users N/C (numerical control machines) controller. MDSI has developed a library of over a thousand of these links each designed for a specific machine tool. The "link" insures that the time sharing service deals specifically with the capabilities, functions and requirements of each machine tool on a highly tailored basis and in so doing it maximizes control and cost efficiencies. The library of software "links" is a multimillion dollar investment which gives MDSI a major competitive advantage in the market place and yet it doesn't appear on the balance sheet, as all development costs were expensed as incurred.

There are currently some 40,000 N/C machines in use in the United States based on the latest available information. It is estimated that approximately 20,000 are used in such simple or static applications that computer assist is not required or are "captive" machines operated by organizations using their own part programming systems. This leaves an estimated 20,000 N/C machines which could be addressed by and sold computer assistance by third party services such as COMPACT II. The U. S. market is believed to be expanding by nearly three thousand new machines per annum as manufacturers seek to expand their manufacturing capacity by taking advantage of the inherent flexibility and relative efficiency offered by N/C machines. Abroad there are an estimated 32,000 N/C machines. The available foreign market for computer-assisted N/C services is presently estimated at some 13,000 units and it also is believed to be expanding by 3,000 new units per annum. Thus, by figures obtained from MDSI officials, it appears the available worldwide market for computer-assisted N/C services is currently about 33,000 machines.

Today, there are approximately 12,000 N/C machines operating domestically with computer assistance; approximately 7,000 of these are on line to MDSI and the other 5,000 are with competitors or captive in-house systems. After MDSI, the largest factor in this market is General Electric (perhaps, 20% of MDSI's size) followed by a large number of other smaller service companies as well as a few manufacturers of N/C machine tools (which offer part-programming services largely for their own machines).

The rate of future growth will depend heavily on the number of numerical control machines and graphic plotters in use with MDSI's time-sharing network. As the numbers of such machines increase so do the number of revenue generating points and the size of MDSI revenue base. This revenue base currently provides approximately 76% of total revenues and is the largest profit contribution for the company. The recent growth in the population of machine tools using MDSI's time sharing services shows the continued strong internal growth being realized.

Fiscal Year End	Total N/C Machines*	Growth Rate #	N/C Machines**	Growth Rate #
1976	7469	29.3%	6757	28.4%
1975	5779	37.3%	5261	35.0%
1974	4209	--	3897	--

* Includes plotters in use at end of year
** Excludes plotters in use at end of year
# Year to year gain, years ending 8/31

Part of this growth is being attained overseas where time sharing operations are underway in England, France, Germany and Japan. In fiscal 1976, international revenues increased 56% to $865,000, but due to heavy start up and expansion costs, the net loss increased from $155,000 in fiscal 1975 to $487,000 in fiscal 1976. Foreign losses are expected again in fiscal 1977 due to start up costs in Germany and Japan but below the levels of fiscal 1976.

INVESTMENT OUTLOOK

As shown in the industry study and highlighted in Appendix B, MDSI has distinguished itself among the eight data services companies studied in the following ways: (1) it has the fastest five year revenue growth rate, (2) it has the highest pretax margin and return on equity (3) it dominates on-line services to its industry, (4) it has no long term debt and (5) it has had the strongest earnings and cash flow growth over the last four years.

First quarter (11/30) earnings per share were flat ($0.14) on 20% greater average shares, second quarter earnings are also expected to be flat ($0.15) and possibly down on 18% greater shares. Price increases of 10% on all time sharing transactions started becoming effective December 15 and should significantly help second half earnings. Revenues for the year should advance about 26% to $20,500,000 despite expected transaction slippage due to weather and gas shortages which could effect manufacturing output and customer's usage of numerical controlled machinery. Second half comparisons will benefit from comparable average shares outstanding. Thus earnings per share should improve sharply in the last six months and take full year results from $0.64 last year to about $0.78 this year (8/31). Preliminarily fiscal 1978 is expected to show revenue growth to $26,000,000 and earnings per share of $1.00 or better. The stock is viewed as an extremely attractive long term growth vehicle. Initial positions should be established and aggressive buying is strongly recommended on any weakness.

PBT makes a market in the shares of Manufacturing Data Systems, Inc. and deals in them as a principal. PBT was also co-manager of the 787,500 share public offering in February, 1976. Additional information is available upon request.

NATIONAL CSS INC. (NCS)

Recent Price	1976-77 Range	Earnings Per Share* 1975	Earnings Per Share* 1976E	Earnings Per Share* 1977E	Price/Earnings 1976E	Price/Earnings 1977E	Div. Rate	Yield	Shares# (000's)
$23	$25-$12	$1.95	$2.85	$3.30	8.1x	7.0x	$0.20	0.9%	1,106

* Fiscal Years end February 28 of following year
# Closely held shares - 8%

NOTE: See Appendix B for comparative financials and operating records

National CSS is one of the smallest data service companies discussed in this study and one of the fastest growing. As outlined in Appendix B, National CSS has realized five year compound revenue growth of 35.5% and in the four year period ending February 29, 1976, operating earnings advanced from $0.36 per share to $1.95 per share for an annual growth rate of over 53%. In the year ending this February 28, revenues are expected to advance to $42,000,000, a gain of 18% and earnings per share of $2.85 are anticipated (up 46%). However, considerable benefits from higher investment tax credits, up from slightly over $100,000 in fiscal 1975 (ending 2/28/76) to about $635,000, reduced the effective tax rate from 50.7% to an estimated 41.2% this year. Earnings this year would have been only about $2.35, up 21% if last years ITC experience ($100,000) was realized. While pretax margins were a modest 12.3% last year, they are expected to advance to about 13.1% this year. Thus the adjusted recent growth has been somewhat less impressive.

As highlighted in the Outlook portion of the industry study, the orientation of National CSS' business put it in many of the fastest growing portions of the data services industry and to properly meet the challenges of growth and competition heavy commitments on systems development (R&D) are necessary. In recent years, National has shown the strongest commitment as a percentage of the sales dollar spent on R&D as well as the fastest rate of growth in the level of such outlays of any of the competitors analyzed. National CSS is investing in its future at a healthy rate which improves the likelihood that they will reap good returns in future years.

Last year, National CSS revenues broke down as follows:

Revenue Breakdown
Year Ending February 29, 1976

($ in Millions)

	Revenues	% of Total	Description
User Systems Development	$11,429	32.1%	NCS Computers used to help customers develop their own programs.

(Table Continued on next Page)

(Table Continued)

User Systems Production	7,511	21.1	Time sharing services
Basic Time Sharing Services	18,940		
Application Services	10,306	28.9	Fees from use by customers of NCS' proprietary programs
Industry Services (RTW)	2,140	6.0	Industry systems sold to the apparel industry.
Data Center Services (TBS)	2,115	5.9	Batch data center services
Professional Services	947	2.7	Custom software development
Systems Marketing	594	1.7	Computer time sold on a contract basis, often including licensed software and people support
Other	561	1.6	
	$35,603	100.0%	

Through nine months (11/30/76) this year, overall revenues were up 18.1% with Application Service revenues reportedly up close to 50% and Industry Services revenues up close to 60%. These groups represented 35% of total revenues last year.

Applications Service revenue growth is being paced by the successful marketing of NOMAD, NCS' data base management system which was introduced in September 1975. NOMAD is an applications package developed to help users manage massive amounts of data and put-it into a format to provide useful management information. It is estimated that NOMAD contributed less than $600,000 to last years Application Service revenues. This year NOMAD is expected to generate about $3,700,000 possibly more. In March 1976, NOMAD monthly revenues were reportedly in excess of $225,000. In the third quarter ending November 30, monthly revenues were running about $350,000. The incremental revenue realization from NOMAD is expected to add at least $3,100,000 and provide roughly 30% of the growth in Applications Services.

Industry Services are strong because of a substantial rebound in the apparel industry which represented 80% of this group revenues and strong market acceptance of a licensed manufacturing system which NCS markets for inventory control, production scheduling and bill of materials work.

The disappointing part of NCS' recent operations is the lack of recent growth in Basic Time Sharing Services. Last year, these services represented 53% of total revenues. Through nine minths, User Systems Development revenues were down about 4% and User Systems Production advanced 4%. Thus total Basic Time Sharing Services through nine months are running approximately 1% behind last year. This lack of progress in such a major portion of NCS total business is disturbing. Given the rapid growth seen by the competition on similar services, one must question the future rate of growth of this major revenue producing segment of NCS' business.

Management believes their greatest future growth opportunities lie in Applications Services and Industry Services Sectors not in Basic Time Sharing. Industry Services are likely to be supplemented by acquisitions where highly specialized industry applications can be added to NCS apparel systems. NCS is constantly on the outlook for such opportunities. Application services based on proprietary software such as NOMAD are obviously to be given top priorty in R&D budgeting and such major efforts are expected to produce strong growth in future years.

OUTLOOK

National CSS has several obvious long term strengths: its heavy commitment to research and development coupled with purchased software from third party sources represented 6.9% of total revenues last year; its return on average equity of 23.7% last year was the second highest among the majors and will be considerally higher this year; its balance sheet is quite strong; NCS is showing steady growth in pretax profitability (margins will be about 13.1% versus 12.3% last year) and operations are generating very strong cash flow well in excess of outlays.

The stock based on the company's considerable long term potential appears undervalued. The stock selling at around $23 is selling at only 7 times our next year estimate. This is despite the strengths outlined above and the considerable growth opportunities in the market sectors served. However, until a better determination of the long term growth of NCS' Basic Time Sharing revenues (53% of last years total revenues) and recently realizing flat year to year revenue results, an attitude of caution on future growth and neutrality on the stock must prevail even in the face of strong earnings momentum. NCS' pays a $0.20 annual dividend and has 1,100,000 shares outstanding with a market value of roughly $25,000,000 and a floating value of about $23,000,000 currently. Additional information is available upon request.

THE REYNOLDS AND REYNOLDS COMPANY (REYNA)

OTC	1976-77	Earnings Per Share*			Price/Earnings		Ind.		
Bid	Range	1975A	1976A	1977E	1976A	1977E	Div.	Yield	Shares (000)
$18	$21-$13	$1.31	$1.71	$2.05	10.5x	8.8x	$0.60	3.3%	4,632#

* Fiscal year ends September 30

# Includes 218,732 shares of Class B equivalent stock as its conversion basis of 20 shares of Class B stock for one share of Class A. Closely held - 16%.

NOTE: See Appendix B for comparative financials and operating records

Reynolds & Reynolds is primarily a business forms supplier, but because of the rapid growth and increasing total systems sophistication in regional time sharing services it is rapidly becoming a significant factor in this industry. In its fiscal year ending September 30, 1976, total revenues were $94,873,000, 62.6% of which were from form sales and 37.4% were EDP services revenues. Five years ago, EDP revenues contributed 32% of total revenues. Over the last five years, form sales increased by 11.2% per annum and EDP services by 16.2% per annum. Over this five year period, total revenues grew by 13.1% and earnings per share by 15.6% per year. In fiscal 1976, due to a large gain in EDP profitability, earnings per share climbed sharply from $1.31 to $1.71.

Reynolds concentrates on specialized business form systems for accounting systems, inventory control and automated record keeping. While these form systems have been used by customers in many industries (Reynolds has close to 100,000 active customers), they have been most dominant in the dealer services market. This sector includes nearly 75,000 dealers in the U.S., of which about 30,000 are automobile dealers representing foreign and U.S. manufacturers. Reynolds has also made significant progress of late in the hospital market. Unlike the forms industry in general which has been aggressively competing for business on a discount basis, Reynolds forms systems are normally not discounted. Last year, only $10,500,000 of custom business was subject to any discounting or less than 18% of total forms sales. According to management, the net effect of discounting was not material last year. Over the last two years, earnings in the business forms industry have declined better than 40% due to weaker volume in 1975 and an industry wide price cost squeeze in 1976. During the same two year period, Reynolds forms sales increased 10.3% per year and the gross profitability of forms sales by 8.4% per year. Now that the outlook for the forms industry is improving and pricing is starting to improve, Reynolds has increased forms prices about 6-7% during the November, 1976 to January 1977 period. This should result in stronger forms earnings starting in the second quarter (3/31) and over the balance of the year.

The last three years have been the building years for Reynolds VIM II (Vital Information for Management) regional time sharing system. VIM offers dealer customer access to a local computer center and a wide range of general accounting services: general ledger, accounts receivable and payable, payrolls, as well as parts inventory control and other management information systems. In the first year, fiscal 1974 (9/30/74), Reynolds established 37 minicomputers in 29 sites and was processing 229 customer systems. Many of these customer systems were transfers from Reynolds batch processing services which limited margin and earnings growth. As a result, VIM lost several hundred thousand and total data services realized a 48.5% gross profit margin, down from 54% a year earlier. For fiscal 1975, full scale expansion of VIM led to the year end expansion to 77 minicomputers in 48 sites with 971 customer systems being processed. Due to the heavy start up costs and the low utilization of computers, coupled with recessionary depressed transaction rates, VIM losses increased to close to $1,000,000 and total data services gross margins declined to 46% (versus 48.5%) and pretax profitability contracted more sharply. Fiscal 1976 continued the rapid growth in the national coverage of the VIM regional time sharing centers with the number of sites up to 71 at year end, employing some 137 minicomputers but now processing over 2,155 customer systems. A combination of sharp improvement in the number of systems processed, coupled with better average monthly transaction experience and more of the new systems coming from new customers resulted in sharply stronger data services profitability. Gross profit margins from data services increased from 46% to 51% and gross profitability of such services advanced 34% year to year.

In fiscal 1976, data services revenues totaled $35,436,000 of which $11,640,000 were from VIM II data services and VIM III (inhouse minicomputers which are primarily sold to large dealers). Thus, the two VIM programs represented 33% of total data service revenues with the balance coming from batch and remote batch services. In fiscal 1975, only 14% of total EDP service revenues were from VIM. During fiscal 1976, VIM revenues increased from $4,084,000 to $11,640,000. This year these programs are expected to increase revenues to about $18,500,000 from VIM II and to close to $3,000,000 from VIM III sales. Thus, total revenues from these sectors should nearly double in fiscal 1977 and profitability should increase sharply. In the last three quarters, the gross profitability of total EDP services has been averaging 50% greater than a year ago's rates.

OUTLOOK

Strong growth in EDP services paced by rapidly expanding revenues from the VIM II and VIM III programs is expected to provide very strong profit gains this year. Also, with incoming order rates for business forms still running ahead about 15% versus a year ago and higher prices being instituted, both forms revenues and profitability are expected to improve in fiscal 1977. Forms revenues are forecast to improve 13% to $67,000,000 and EDP revenues about 27% to $45,000,000. This will represent a year-to-year gain in total revenues of 18% to $112,000,000. Even allowing for some cost increases in labor, materials, et al, the efficiencies of rapidly expanding EDP operations and the improving volume and pricing in business forms should expand pretax margins from 15.3% in fiscal 1976 to at least 16.0%, and earnings per share is estimated to advance from $1.71 to $2.05-$2.10.

The stock is currently attractive for accumulation, selling at approximately 9 times this year's earnings. Reynolds is expected to be able to sustain long term earnings growth of 13-14% per annum beyond this year. Given its considerable progress in regional time sharing services and applications to dealers, it is anticipated that the stock will show further P/E improvement in the years ahead.

PBT makes a market in the shares of Reynolds & Reynolds and deals in them as a principal. Additional information is available upon request.

TYMSHARE, INC. (TSHR)

Recent Bid	1976-77 Range	Earnings Per Share* 1975	Earnings Per Share* 1976E	Earnings Per Share* 1977E	Price/Earnings 1976E	Price/Earnings 1977E	Ind. Div.	Yield	Shares (000)
$16	$28-$14	$1.21R	$1.50	$1.80	10.6x	8.9x	None	-0-	4,304

R Restated to reflect the estimated effects of three poolings: Medical Data Systems, Unitax and Simplified.
* Years ending December 31.

NOTE: See Appendix B for financial and operating comparisons

Tymshare is noted as one of the industry's top suppliers of time-sharing services and generates approximately 55% of total revenues from remote computing services, most of which is of the time sharing variety provided through an international data network.

Tymshare's information network system (Tymnet) has been built and designed internally unlike Automatic Data Processing's which was the product of several acquisitions. However, Tymshare's acquisition program has been very vigorous over the last two years commencing with the United Data Centers acquisition, in December 1974 which established Tymshare in the batch data processing business. Since December 1974, Tymshare has made seven acquisitions and four investments in foreign companies (two in France, one in West Germany and one in Japan) where miniority investment positions have been established. The seven acquisitions were heavily oriented toward expanding Tymshare's capabilities in Industry Services. U.D.C. the largest of the acquisitions was acquired on a pooling of interest basis and added $13,500,000 to revenues in 1974. This acquisition provided specific industry capability in tax preparation services (Dynatax), computerized processing for fuel oil distributors (COMPUTAFUEL) and computerized processing for the cable T.V. industry (CABLEFACTS). Tymshare subsequently acquired companies serving the health care industry (Medical Data Systems), the travel industry (Western Twenty Nine), computer tax services (Unitax) and additional coverage of fuel oil distributors (Simplified).

In 1976 Tymshare's revenues are expected to total $82,500,000 with about $31,000,000 represented by the seven acquisitions made since December 1974. This is believed to have been the largest percentage contribution to any data company's revenue growth over this period. Equally important to Tymshare's earnings growth has been the ability of management to absorb and steadily improve the profitability of the numerous acquisitions.

In 1974, United Data Centers contributed $13,510,000 in revenues and $547,000, to net income on a pooling basis. Revenues in 1974 exclusive of U.D.C.'s contribution were $32,945,000 and net income was $2,751,000. By my calculations, internal revenue growth in the subsequent two year period, excluding all acquisitions, took volume from $32,945,000 to about $51,500,000 estimated for 1976 for a compound annual growth rate of 25%. Internal earnings growth is believed to have been somewhat faster.

What accounted for such rapid internal growth? Two things are most responsible: (1) the expansion and upgrading of time sharing services through Tymnet, the international information network and (2) Tymshare's development of new applications packages to sell to current customers and to entice new ones.

Tymnet's international data network consists of computer centers in Cupertino and Palo Alto, California, Houston, Texas and Valley Forge, Pennsylvania. As of December 31, 1976, Tymnet employed 42 computer systems consisting of 27 Xerox 940s, 11 Digital PDP10s and 4 IBM 370/158 in its information network. This network now serves over 100 cities with local dial up capability. Foreign customers in Europe are serviced on-line through a small center in Paris, France but primarily through the U.S. computer centers. The U.S. network employs over 200 minicomputer "nodes" for local "log-in's" for error corrections and transmission control throughout the system. Domestic communication is both by leased lines and via the Westar Communications Satellite. Tymnet is largely used for time sharing, a smaller portion of total transactions are done in either a remote batch or remote job entry mode.

Management indicates that they have no figures available on the growth rate of time sharing customers, nor recent average monthly experience data per customer nor the latest total monthly volume of on-line transactions. The absence of such figures on a comparative basis makes it extremely difficult to assess and accurately forecast earnings growth and increases the risk of surprises.

In recent years, time sharing revenues have contributed about 50% of total revenues. Due to improved market penetration in those cities served, and increased acceptance of Tymshare's proprietary packages, time sharing revenues are expected to pace company growth. Improving the quality and reliability of time sharing services to existing markets has been a top management priority. Management has done this by expanding the use of minicomputers or "nodes" to improve the accuracy of transmitted information. Management also incorporated a network supervisor program to control the overall traffic flow and to optimize routing. While such advancements improve system reliability and data communications efficiency, it is applications know how which generates increased revenues and attracts new customers. In 1975, Tymshare introduced MAGNUM - a data base management system for customers with central information systems allowing users to control greater volumes and diversity of information. Also introduced was SURVEY, an on-line market research service for processing and analyzing survey data. TYMQUOTE is a time-sharing proprietory data base containing extensive historical information on more than 23,000 securities. In 1976, Tymshare introduced FOCUS, another data base management system but one tailored for IBM users and oriented to IBM software. Such general purpose packages have reportedly been well received and helpful in attracting new customers as well as expanding the breadth of services sold to current customers.

Tymshare is emphasizing its rapidly growing Industry Services Group. Today these services are largely oriented to tax processing services, computerized accounting for fuel oil distributors and processing services for the health care, travel and cable T.V. industries. The processing services are offered in batch processing, time sharing and remote batch modes. These industry specialties are based on strong specific applications capabilities relevant to the industry and in most cases the ability to offer broad industry systems encompassing many applications. Such industry services are largely the result of acquisitions and now represent about $25 million in annual revenues. This type of service will continue to represent the main hunting ground for future Tymshare acquisitions and a heavy area of R & D outlays for systems development.

OUTLOOK

Obviously, future growth will depend to a major degree on the rate of future acquisitions, the size of such acquisitions and the method of accounting (an increase in purchases can stimulate earnings growth). Tymshare does possess considerable time sharing capabilities, a large and progressively more profitable information network and a growing expertise in industry services. Revenues this year are expected to exceed $82,000,000, and pretax margins should be about 16.1% versus 15.3% in 1975 providing earnings per share of $1.50 adjusted for poolings, versus about $1.21 in 1975 restated for poolings.

Internal growth alone would be expected to carry revenues upward to near the $100,000,000 mark this year and produce earnings per share of about $1.80. The one near term factor that has adversely affected stock performance is weaker pricing. A repricing of time sharing services last July increased prime time processing charges 4% and initiated a 40% discount for off hour (6:00 p.m. to 8:00 a.m.) processing. This led to a 3 to 5% loss in average realized revenues due to the migration to off hour processing. While monthly transaction experience is reportedly now "back on plan", the price deflation is expected to continue to limit relative earnings growth short term and leave investors cautious despite extremely attractive long term growth prospects. Earnings this year are expected to improve due to continued improvements in Tymnet's utilization and continued growth and cost streamlining of industry services (particularly the newer acquisitions). Tymshare is expected to be the fastest growing data services company with revenues over $50,000,000 over the next few years with earnings growth expected to average in excess of 20% per annum. Near term, the absence of a dividend could limit relative performance. However, this company appears to offer unusual value longer term at current P/E levels (around 10x) and accounts oriented to high growth equities should consider Tymshare an apt vehicle. Additional information is available upon request.

APPENDIX A

Definitions of Commonly Used Terminology

Batch Services - The non-terminal entry, normally carry-in processing business. These services are normally done at a data service center, processed overnight and returned by messenger the next day.

Custom Software - Designed to meet the specific needs of one particular client. Normally, a low margin-high risk business.

Data Base Management Systems - A tool or a set of programmed instructions which enable the user to build a framework of data which, when properly related, can generate information in a useable form.

Dedicated Information Systems (DIS) - Offering remote computer systems dedicated to providing a specific type of service. These systems are of two types: those that provide specialized data processing services (i. e. - hospital accounting, automobile dealer accounting and engineering computation services) and those that provide access to a single data base (stock quotation services, computerized credit bureaus and reservation systems).

Facilities Management - The data service company which provides the user with hardware, software, maintenance and people under one total system contract.

Interactive Time-Sharing - A computer system that enables multiple users to gain simultaneous access to its facilities and to interact with the system in a conversational mode.

Network Information Services (NIS) - Nationwide communication networks that permit geographically dispersed users to access a centralized data base.

Packaged Software - The development of standard application software packages to an industry or applications need and sold generally to a variety of customers.

Raw Power Applications - The agent normally supplies the computer time while the user utilizes his own software and data base.

Remote Autotransaction - Companies provide computer services either in a remote batch or interactive mode plus applications and industry specialized software in order to provide the customer transaction processing and data base inquiry applications. Companies tend to specialize in order to achieve a dominant application or industry specialty in rendering such services.

Remote Batch Processing - A system that enables users at remote locations to enter data, initiate the batch-mode executive of programs and receive the resulting output data. The actual processing is often deferred till later in the day or night at lower computer usage rates.

Transaction Processing - The user pays for computer services based on the number of transactions processed, checks, orders, payrolls, inventory items. The user supplies and maintains his own data base but often utilizes the service bureaus software.

APPENDIX B

EARNINGS OUTLOOK

	Primary E.P.S.# 1975	1976E	1977E	Trailing 12 Months	E.P.S. Gain Year to Date*	Next Quarter Comparison 3/76	3/77E	% Change Estimate
AUD (6/30)	$0.99	$1.26A	$1.55	$1.42	+ 26.3% (6)	$0.33	$0.41	+ 24.2%
BDR (12/31)	1.00	0.75	0.90	0.88	- 16.4% (9)	0.26	0.17	- 34.6
CSC (3/31)	0.51	0.80 (2)	1.00	0.74	+ 63.9% (9)	0.13	0.22(2)	+ 69.2
EDS (6/30)	1.21	1.10A	1.25	1.13	+ 5.4% (6)	0.26	0.32	+ 23.1
MDSY (8/31)	0.53	0.64A	0.78	0.64	--	0.15(1)	0.16(1)	+ 6.7
NCS (2/28)	1.95	2.85	3.30	2.62	+ 47.5% (9)	0.54(1)	0.75(1)	+ 38.9
REYNA (9/30)	1.31	1.71A	2.10	1.78	+ 22.9% (3)	0.39	0.48	+ 23.1
TSHR (12/31)	1.21R	1.50	1.75	1.46	+ 26.3% (9)	0.57	0.66	+ 15.8

#Operating income only

(1) Quarter ends 2-28-77

*Period covered shown parenthetically

RRestated to give effect to recent acquisitions

(2) Excludes ITC benefits which add $0.05 per quarter and $0.20 per year

OPERATING RECORDS

	Year End	Five Year Growth Rate Revenue	E. P.S.	Number Years EPS Up	Pretax Margins 5-Year Average	Last Yr.	Last Year Net
AUD	6/76	27.2%	56.3%	27	17.8%	18.6%	9.4%
BDR	12/75	42.6%	27.2%	1	12.7%	12.7%	6.1%
CSC	3/76	17.7%	15.3%	4	(Neg.)	6.6%	3.2%
EDS	6/76	12.0%	4.3%	0	23.5%	20.0%	10.2%
MDSY	8/76	75.8%	NC	4	13.4%	23.7%	10.7%
NCS	2/76	35.5%	NC	5	10.6%	12.3%	6.1%
REYNA	9/76	13.1%	15.6%	2	15.3%	15.3%	8.4%
TSHR	12/75	40.7%	NC	4	9.5%	16.3%	8.1%

BALANCE SHEET AND OTHER FINANCIALS

	Data As Of	Current Ratio	Lt Debt/ Equity	Book Value Per Share	Net Return Average Equity*	Reinvestment Rate#*
AUD	6/30/76	2.2 to 1	3/97%	$ 6.94	19.8%	16.5%
BDR	9/30/76	1.1 to 1	0/100%	11.21	9.7%	7.8%
CSC	10/1 /76	2.1 to 1	64/36%	2.05	21.1%	21.1%
EDS	9/30/76	3.3 to 1	3/97%	6.10	19.0%	9.5%
MDSY	11/31/76	2.1 to 1	0/100%	2.35	26.8%**	26.8%**
NCS	11/31/76	2.3 to 1	22/78%	10.96	23.7%	21.2%
REYNA	9/30/76	3.5 to 1	25/75%	9.52	18.9%	13.2%
TSHR	9/30/76	1.8 to 1	22/78%	6.92	26.1%	26.1%

#Net income minus dividends divided by average equity

**Used year end equity due to major equity financing

* Based on last fiscal year.

David A. Henwood, C.F.A.
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AUTOMATIC DATA PROCESSING (24)
NYSE - AUD

EPS'77E - $1.60	P/E'77E - 15x	'76-'77 Range - 36-23	Yield - 1.0%
'78P - $2.00	'78P - 12x	P/E Range - 23x-14x	Dec.Vol.- 389M

At the quarterly security analysts meeting on February 16th and in a Dow-Jones interview the day before, ADP raised its earnings growth estimate for FY 1977 to 25% from its original "about 20%" forecast. This brings the company's stated forecast in line with our long standing estimate of $1.60 per share for FY 1977 (June). Further, with business exceptionally strong, the rate of new account additions surging, and margins improving we now view our FY 1978 forecast of $1.90 as too conservative. We will revise this figure upward to $2.00 (+25%). Automatic is in an accelerated growth phase (+27% in FY 1976, +26% estimated in FY 1977, and +25% projected in FY 1978) which may not be sustainable long term, we believe the long term growth rate 18%-20%, but is visible over the next year and a half. This is based on the recently expanded and increasingly productive marketing force, the surge in payroll account additions as banks continue to exit this business, and the profit margin improvement which is expected in a number of special industry data service areas such as the auto dealer sector, on-line network data services, real estate management services, and hospital and nursing home services.

Commercial data services are the heart of ADP, representing over half of revenues although diminishing slightly as a portion of the total as special industry data services are added to the mix. Payroll preparation, 33% of total revenues, are expanding at an impressive rate, total clients ahead 18% in the recently completed quarter and revenues up more than 20%. Total payroll accounts number 37,000 now. The backlog of new payroll accounts is the largest in the company's history. The customer size is increasing. New customers of over 1,000 employees are ahead 50% and new customers of 500-1000 employees are ahead 35%. Other commercial services are also expanding rapidly, the accounts receivable service ahead about 17%, general ledger up 25%, and accounts payable ahead 33%.

The growth characteristics of the business are attractive. In the recent quarter just 13% of the incremental growth stemmed from acquisitions, the remaining 87% of the growth was internal. Automatic's business is highly repetitive with 85% of revenues continual, no need to resell the accounts annually. Further, the excellent revenue and earnings growth is despite significant re-investment, development, and expansion in various areas temporarily impacting earnings in order to build for the future. This is the case in auto dealer services, the banking and savings and loan services, and on-line network data services. The balance sheet remains strong with $22 million in cash and securities currently and no debt. A major capital spending program is planned for facilities, computers and other equipment which will push such expenditures up to $32-35 million this fiscal year over the $15 million rate last year. It will remain at this high level again in FY 1978.

Automatic is unique amongst the companies we cover. Its record is outstanding (virtually perfect), it is a leader in a burgeoning market, well managed, almost no foreign exposure, within an attractive broad customer mix, minimal competition, and excellent operating leverage and economies of scale. Revenues this year will be around $235 million. We believe the shares represent excellent value and strongly recommend purchase. (Additional details - Research Notes February 14th)

STEPHEN T. McCLELLAN

Reduction in competition permits price increases.

Combined companies secure higher return on capital

Assists a company to reach a more efficient size
- little is known of the relation between size & profitability

* Mergers as such do not bring economies of scale
  E of Sc. follows when
    product line is rationalized
    sales forces are integrated
    production is redistributed
  Tasks not easily accomplished

Mergers contribute to higher return on investment.
  if they lead to fuller utilization of existing capacity.
  - underemployed sales force

The policy of diversification by merger is sometimes justified on the grounds that the corporations existing business offers too little opportunity for the profitable employment of the company's funds.

Companies justify acquisition program in one of 3 ways

- reduced risks by diversification
- acquired stock is undervalued relative to its own
- leads to improved efficiency.

ADP. Automatic Data Processing, Inc.

March 9, 1976

TO: Commercial Services Managers
FR: Josh Weston

CC Division Managers
Corporate Staff

RE: Monthly Management Newsletter

Since the last newsletter, ADP announced our next new venture...it's in Brazil and is together with a minority partner. Here's an excerpt from the recent press release.

> ADP has reached an agreement in principle to acquire majority control of Systems, S.A. of Brazil. Adella Investment Company of Brazil will remain as a minority shareholder in Systems, S.A.
>
> Systems, S.A., serving approximately 300 clients in Brazil, is a data processing services company with annual revenues of approximately $2.5 million. The acquisition will mark ADP's entry into the South American market.

Because of ADP's many acquisitions over the years, it's generally hard for most of us to remember what ADP's true total growth rate has been. Every time we've "pooled" in a new company, we've had to restate our history as if we owned that new company from the very beginning. As a result, our historical statistics in financial reports make those old days look bigger than they really were.

To satisfy my own curiosity...and perhaps yours...I've written down ADP's real growth rate by showing each past year as it was initially reported, and not as it was restated by subsequent acquisitions. If we thought we were managing a very fast horse on a very tough track, the corrected data shown below makes the word "very" sound too modest.

ADP's revenues and earnings per share as originally reported each year:

FY: '63-$ 1 million, $.01/share
'64-$ 2 million, $.03/share
'65-$ 3 million, $.06/share
'66-$ 5 million, $.17/share
'67-$ 9 million, $.27/share

FY: '68-$16 million, $.36/share
'69-$27 million, $.48/share
'70-$39 million, $.66/share
'71-$49 million, $.87/share
'72-$62 million, $1.14/share

FY: '73-$ 90 million, $1.40/share
'74-$112 million, $1.64/share
'75-$155 million, $1.98/share
'76-What's your guess?

When you look at the above numbers, also take a minute to think of how much we, as managers, have to learn and have to change, in order to do an effective job in such a rapidly changing environment.

* * * *

Even though this is a Commercial Services newsletter, there are many other important divisions in ADP...here's word of one of them...the Financial Data Services Division (or FDS, for short).

The Financial Data Services Division of ADP performs a variety of functions for the "Wall Street" community, including brokerage accounting for approximately 50 stock brokers and portfolio reporting services for institutions that manage investment portfolios. FDS also has an "on-line inventory system" to help brokers with their inventory of securities.

FDS differs from most of our centers because it has relatively few people and some very big computers. FDS gets its clients to do most of the data entry. Therefore, although FDS is almost as big as the Clifton Regional Center, it has only 1/3 as many people as in Clifton, while its four large computers have probably twice the CPU power of Clifton.

One of the most recent services in FDS is called the Data Network Service. It started from scratch a few years ago, and is under the direction of Armand Keim. DNS provides communications network services to seven major brokerage firms (six of which have been signed in the last six months!) The DNS Communications network links all of the branch offices of a brokerage firm directly to ADP's computer complex at 4 New York Plaza. From there, the broker's buy and sell orders are logged and switched to any of the major securities Exchanges in the country. After an order has been executed, the execution report is matched against the original order for accuracy and then it is transmitted back to the originating branch office via ADP's network.

The Service is now switching over 35,000 messages and orders on a given day, up from only 10,000 in August 1975, and the current level is expected to double in the next several months. As the New York Stock Exchange and other major Exchanges become ore automated and evolve toward a single nationwide securities market, DNS is one of the steps that ADP has taken to make sure our clients have all the tools they need to properly service their customers.

* * * *

We recently hired a salesman who had previously worked for a competitor for six years. He told us that it was a standard competitive device in his former sales force to ask each of their prospects to attempt to call the ADP "service department" with some planted questions. The competitor's hope, obviously, was to get their prospect to run into poorly attended phone service at ADP.

How sure are you of the quality of telephone service in your department? Perhaps, you ought to sit in on some live dialogues...or even call in via an outside trunk-line on occasion to see ourselves as a client sees us.

* * * *

Here's a quote that I read recently. It seems very true to me and it's a challenge to all of us. How do we keep this statement from applying to ADP for as long as possible? T'ain't easy.

(over)

"Virtually all institutions, no matter how noble their purposes or how vigorous their first few years may be, grow stale and soft eventually."

* * * *

ADP-Manhattan has now tied Buffalo as a regional center with three separate payroll job steams. In Manhattan, we now have Autopay II (because we've begun to convert Citibank payrolls from their former Broadscope package), PHI (because Manufacturers-Hanover Bank clients are running live in our center under their prior PHI package), and Broadscope (until we finish converting the Citibank clients to Autopay II).

In Buffalo, we're converting the long-standing Honeypay clients from Honeywell to Autopay II, so that Buffalo can drop its Honeywell computer next fall. We've got some clients on each system, plus many more still functioning on PHI (as originally inherited from the Marine Midland Bank).

So...for those centers who are burdened this Spring with an Autopay II conversion from Autopay I...you've got it easy compared to Manhattan and Buffalo.

Speaking of Autopay conversions, Cincinnati was the first one to go this Spring. So far, all parties involved say that it looks like the smoothest one to date. That's an encouraging beginning to a very busy conversion season.

* * * *

Our annual planning cycle is now in full swing. The first segment that we'll tackle for Fiscal '77 is each region's sales plan...because our sales levels determine many later steps in the budget process. During March we'll be nailing down our sales objectives, sales staffing plans, and sales expenses for each regional center. This process involves each sales exec, each general manager, the division execs, and the sales staff in Clifton.

By the end of March, we'll have our '77 sales sights set. April is devoted to establishing each center's other key objectives for '77, in summary form. By the end of April, the regional execs, division execs, and the Group's staff in Clifton should be in accord on the general goals in each regional center for the ensuing year.

Then May becomes number-crunching month, as we do detailed monthly budgets in each center. The primary purpose of this detail is not masochism...it is to create monthly milestones in each cost center of each region, so that at the end of each month each manager can see how he's doing compared to his plan.

June is used for last minute corrections to those few regional plans whose April and May planning assumptions become obsoleted before the new year even begins. After that, the "only" remaining task is to work at "beating" the plan.

* * * *

Recent Promotions (Some a little late in being announced)

Boston. Joe Callahan to Northeast Division Staff. Bill Flibotte to Computer Operations Manager. Tony Ierardi to Accounting Services Manager. Bob Milosavljevic to Second Shift Production Supervisor. Milton Thorogood to Second Shift Keypunch Supervisor.

Chicago. Myron Haines to Director of Operations. Tom Skoczen to Manager of Computer Operations.

Denver. Ron Stock to Director of Sales.

Detroit. Michael Bruce to Director, Computer Operations and Data Input. Dan Ewart to Vice President of Operations. Ed Katrosic to Director of Payroll & Customer Relations.

Philadelphia. Joe Sciacca to Director of Operations. Tom Riney to Manager, Computer Room Operations.

Providence. Bill George to Director of Sales.

St. Louis. Myron Bartlett to Vice President of Operations. Lloyd Miner to Vice President of Sales.

Stamford. Tom Feeley to Sales Training Manager.

Syracuse. James Trexler to Operations Director.

Columbus. Nick Sommer to Director of Operations.

Pittsburgh. Joe Yoest to Traffic Supervisor.

Long Island. Charles Fried to Payroll Manager.

Atlanta. Brad Childress to Customer Relations Manager.

Los Angeles. Bob Obuch to Director of Customer Relations.

Science & Medicene

S & M General
S & M Financials
S & M Prospects
S & M Agreement
S & M Trust Agreements

PDS

Acquisition Forms

Acquisition Procedures Draft Memo
Acquisition Investigation Report Form (short)
Acquisition Investigation Report Form (long)
Break Even Analysis

Geographic (General)

Files contain a list of competitors in the following cities:

Atlanta
Buffalo
Chicago
Connecticut
Dallas
Maryland, Virginia & Washington, D.C.
Massachusetts
Michigan
Minnesota
New York
Ohio - (Cleveland, Cincinnati, Canton, Colombus, Lexington & St. Louisville)
Philadelphia
San Francisco
St. Louis

GEOGRAPHIC FILES

Alaska
Atlanta
Brazil
California
Canada File #1 - #2
Cincinnati
Connecticut
Dallas
Denver
Europe - 3 files
Florida
Germany
Hawaii
Houston
Indiannopolis
Kansas City
Memphis
Milwaukee
Minneapolis
North Carolina/South Carolina
Ohio
Philadelphia
Portland
Providence
Rochester
San Diego
Seattle

TRENDS IN THE REMOTE COMPUTING MARKET PLACE

* * * * * * * * * * * * * * *

D. W. FOSTLE
SEPTEMBER 9, 1977

PREMISE:

TECHNOLOGICAL DEVELOPMENTS HAVE CREATED COST-EFFECTIVE ALTERNATIVES TO MANY OF TODAY'S INTERACTIVE SERVICES

* * * * * * * * * * * * * * * *

THE TREND - WHILE STILL IN THE EMERGENT PHASES - IS QUITE CLEAR AND HAS TWO COMPONENTS:

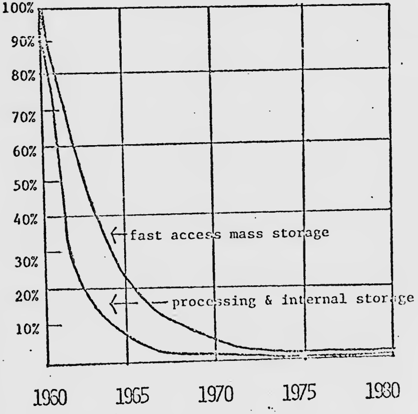
1. RATIONAL / ECONOMIC
2. NON-RATIONAL / EMOTIONAL

THE ECONOMIC BASIS

DEVELOPMENTS:

1. MASSIVELY REDUCED HARDWARE COSTS THROUGH IMPROVED TECHNOLOGY

TECHNOLOGY TRENDS - COST VS CONSTANT PERFORMANCE



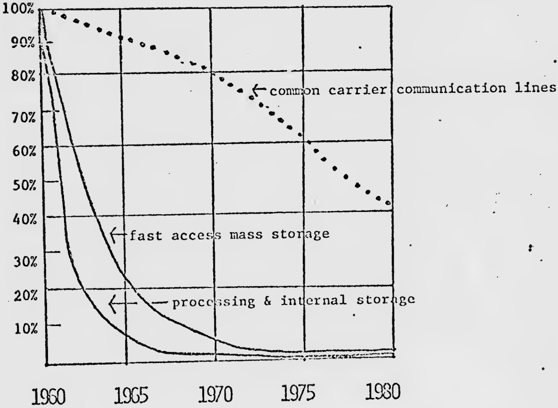
IBM MEMORY COST $/BYTE

1969 - $1.00 (S/3)
1971 - .64 (370/135)
1973 - .30 (370/115)
1976 - .18 (168 CUT)
1977 - .07 (SERIES 1)
COST REDUCTION - 93%
(30% / YEAR)

THE ECONOMIC BASIS

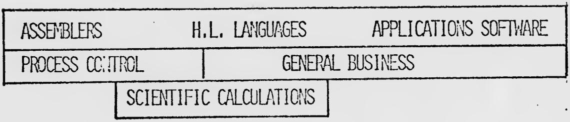
DEVELOPMENTS

1. MASSIVELY REDUCED HARDWARE COSTS THROUGH IMPROVED TECHNOLOGY.
2. DURING THE SAME PERIOD COMMUNICATIONS COST HAVE FALLEN LESS DRAMATICALLY.



THE ECONOMIC BASIS

1. MASSIVELY REDUCED HARDWARE COSTS THROUGH IMPROVED TECHNOLOGY.
2. DURING THE SAME PERIOD COMMUNICATIONS COST HAVE FALLEN LESS DRAMATICALLY.
3. HARDWARE VENDORS ARE IMPROVING THE QUALITY OF SOFTWARE OFFERINGS TO:
    - A. MOVE INTO NEW MARKETS
    - B. LENGTHEN PRODUCT CYCLE



ASSEMBLERS H.L. LANGUAGES APPLICATIONS SOFTWARE

PROCESS CONTROL

GENERAL BUSINESS

SCIENTIFIC CALCULATIONS

THE ECONOMIC BASIS

1. MASSIVELY REDUCED HARDWARE COSTS THROUGH IMPROVED TECHNOLOGY.
2. DURING THE SAME PERIOD COMMUNICATIONS COST HAVE FALLEN LESS DRAMATICALLY.
3. HARDWARE VENDORS ARE IMPROVING THE QUALITY OF SOFTWARE OFFERINGS.
4. APPEARANCE OF COMMUNICATIONS ALTERNATIVES.
    - A) VENDOR-SUPPLIED COMMUNICATIONS SOFTWARE.
    - B) VALUE-ADDED NETWORKS.

THE ABOVE FOUR DEVELOPMENTS EFFECTIVELY REDUCE THE "ADVANTAGES" OF AN ON-LINE SERVICE BY REDUCING THE BARRIERS TO USER IMPLEMENTATION OF SYSTEMS.

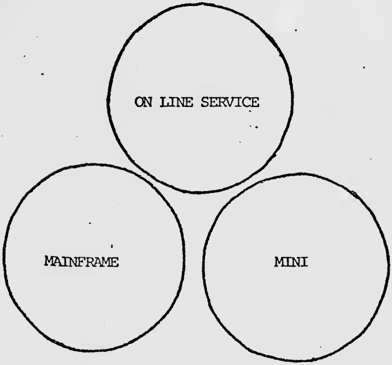
THE NON-RATIONAL / EMOTIONAL BASIS

THE MINI-ORIENTED ENVIRONMENT

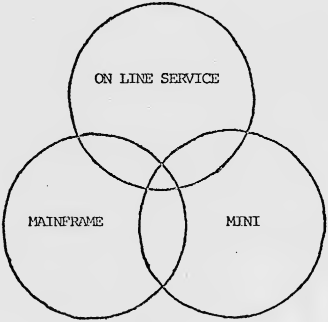
"FULLY COSTED" DECISIONS ARE RARE - 22% BY SURVEY

"CONTROL" IS PREFERRED - 80% BY SURVEY

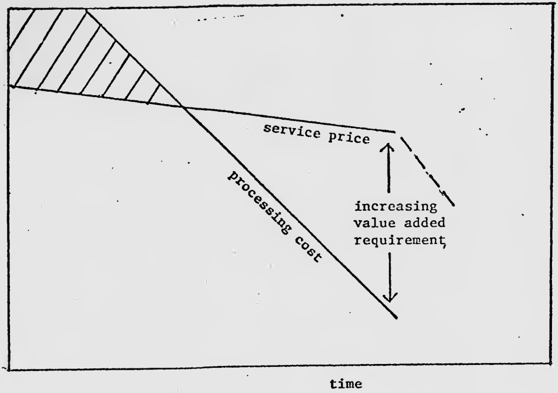
MARKET MOVEMENTS



1969

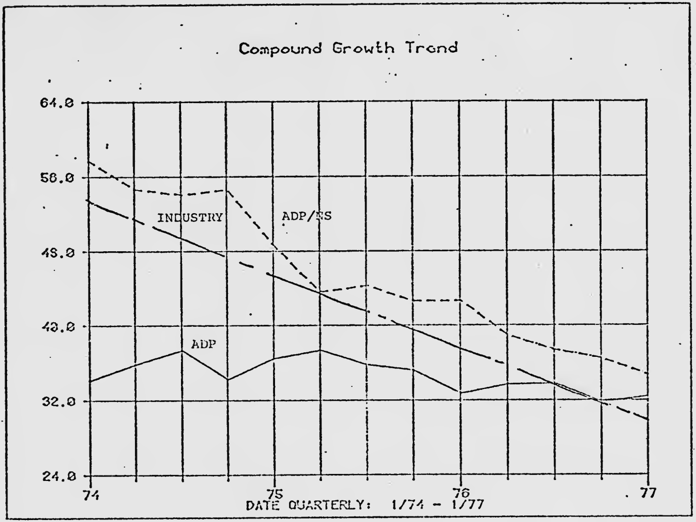


1977



INTERACTIVE SERVICE COMPANY EFFECTS

1. INDUSTRY GROWTH IS DECELERATING
2. PRODUCTIVITY IS FALLING
3. PRICE COMPETITION IS INTENSIFYING


Compound Growth Trend
64.0
56.0
48.0
40.0
32.0
24.0
INDUSTRY
ADP/ES
ADP
74
75
76
77
DATE QUARTERLY: 1/74 - 1/77

THE PRESENT ENVIRONMENT - INDUSTRY

AVERAGE REVENUE GROWTH = +27.4% PER YEAR

1 YEAR AGO, INCREASE OVER PRIOR = +23.3%

6 MONTHS AGO, INCREASE OVER PRIOR = +20.8%

3 MONTHS AGO, INCREASE OVER PRIOR = +17%

NETWORK SERVICES PRODUCTIVITY

	FY '77	FY '76	CHANGE
RPE	53.5K	59.7K	-10%
RPS	125K	139K	-10%

INDSUTRY PRODUCTIVITY DOWN 8.5% TO $42.3K RPE

PRICE COMPETITION

RAPIDATA, TYMSHARE, ADP/NS PRICE CUTS
CANNIBALIZATION OF ACCOUNTS

VULNERABILITY

ACCOUNT CONCENTRATION, JULY, 1977

25% OF REVENUE = 5 ACCOUNTS (50K)

50% OF REVENUE 31 ACCOUNTS (11K)

75% OF REVENUE = 111 ACCOUNTS (4K)

* * * * * * * * * * * *

AVG HP 3000 = 5.85K/MO FOR 3 YEARS

AVG PRIME 400 = 4.29K/MO FOR 3 YEARS

LOST ACCOUNTS

BELL & HOWELL	CHICAGO	10K
SCIENTIFIC GAMES	ATLANTA	15K
AMERICAN NATIONAL BANK	CHICAGO	4K
HARRIS BANK	CHICAGO	3K
LTV	DETROIT	8K
NATIONAL BANK OF DETROIT	DETROIT	7K
ROBERTSON DISTRIBUTION	HOUSTON	5K
DALLAS MENTAL HEALTH	DALLAS	8K

POTENTIAL SOLUTIONS

SPECIALIZATIONS IN:

- DATA BASES
- INDUSTRIES (VERTICAL, SUCH AS BANKING, GOV'T ETC.)
- APPLICATIONS (HORIZONTAL, SUCH AS CONSOLIDATION, MODELLING, PERSONNEL)

REDUCE PRICES - EXISTING SERVICE

DEVELOP ALTERNATIVE DELIVERY TECHNOLOGY

- EXISTING SERVICES
- NEW SERVICES

- In the longer term, the effect of acquisitions on the services industry will be one of stabilization. As smaller companies are integrated into their new parents, the larger company's standards and business procedures will be imposed on the acquired companies. This in turn will "ripple" through other small competitors resulting in the eventual lessening the "cottage industry" image.

- Agressive acquisition programs by larger companies will result in the industry's leadership residing in a few large firms. By 1983, no less than five companies will exceed $500 million in annual sales, and many more will reach the range of $200 to $500 million.

- However, the total number of companies included in the industry will increase and not diminish during the next five years, as those which disappear through acquisition and abandonment will be replaced by a higher number of "new starts" in a variety of new service areas.

    - The overall effect, however, will be a continuing concentration of size in a few companies. Those companies which will be acquired will have achieved multi-million dollar size (perhaps even tens of millions) while the new starts will require a few years of operation before reaching that size.

    - As many as ten or twenty new "one year olds" will be required to achieve the revenues of a single recently acquired "eight year old".

III. THE IMPACT OF ACQUISITIONS ON THE SERVICES INDUSTRY

A. HISTORICAL ASSESSMENT

B. EFFECT ON MARKET SHARE

C. COMPETITION

D. MANAGEMENT STRATEGIES

A. HISTORICAL ASSESSMENT

- The character of the computer services industry has changed dramatically since its inception more than 20 years ago. During its formative stages and continuing through the late 1960's, the industry was comprized of small companies with generally easy-to-classify, homogeneous business activities. Included in this group of service firms were:

  - Batch Service bureaus
  - Contract programming companies
  - Software development companies

- As computer technology evolved, services companies changed by responding to the challenge -- utilizing new technology, pioneering new applications, and developing a proud list of computer related services.

  - Software products businesses emerged.

  - The time-sharing "boom" began, spinning off some 200 participants before 1970.

  - Facilities management companies entered the marketplace and experienced dramatic growth.

- Perhaps the least understood industry force began to appear a few years prior to 1970, as the early move toward the development of nationwide services companies with a growing array of diversified services gathered momentum.

  - Automatic Data Processing, with Fiscal 1967 revenues of less than $10 million, expanded its payroll business into new geographic areas with the acquisition of Research Calculations, Inc. of Boston (January 1967) and Computer Services of Florida, Inc. (September 1967). Just prior to these acquisitions, ADP's first major push to diversify resulted in acquisitions of companies in the brokerage processing and printing/publishing business.

  - In 1967, CDC acquired CEIR an early leader in the computer services industry. The processing workload was gradually moved from CEIR's IBM batch systems and GE time-sharing hardware to the CDC network which in that time frame was already being upgraded to include 6000 series equipment. At the same time, CDC started developing its education, professional, and maintenance services through acquisitions of companies such as Howard Research, Comma, and Syntronic.

- Since the few early mergers of the 1966-1968 period, acquisitions measured in hundreds have been completed, with ADP alone responsible for some sixty. Generally speaking, strong companies have acquired weak ones, and the survivors have learned how to run new businesses, select new markets, and profitably distribute new products.

- During this period of the past ten years, merger activitiy in the computer services industry appears to have been subject to the same periodic fluctuations that correspond to the business cycle.

  - As an example, the number of acquisitions completed by ADP in the Fiscal year marked by the 1973-1974 recession was one half the number completed in normal business years both before and after.

- What has become recognized by the successful computer services companies is the need for strong marketing, finances, returns on capital, and able management. While there is some element of searching for these characteristics in most acquisitions, companies primarily justify their acquisition programs in one of three ways:

  - the expectation that the merger will lead to some form of improved efficiency.

  - the acquired stock is undervalued relative to its own.

  - the acquisition reduces business risk by diversification.

- The most difficult lesson learned by companies which have participated in the industry's consolidation is that mergers as such do not bring economics of scale. These economics follow when, and only when, sales forces are integrated, production is redistributed, and the products are rationalized - tasks which are not easily accomplished.

B. EFFECT ON MARKET SHARE

- Acquisitions in the computer services industry have had an impact on market share in several ways. Generally, those firms with successful acquisition programs have grown more rapidly than the industry as a whole, and hence have continuously increased market share during the past ten years.
  - Examples of this are seen in Exhibit III-1 where the growth of ADP, Tymshare and Itel Data Services are shown in comparison to companies in their size categories with less active acquisition programs.
- Another view of how market share is impacted by acquisitions is provided by examining the changing product mix of firms with active acquisition programs.
  - As shown in Exhibit III-2, Tymshare's product line revenues estimated through 1980 provide an indication of how acquired businesses double as a percentage of the total share between 1976 and 1980 (from 20% to 40%), a rate well in excess of the remainder of the industry.
- Larger computer services firms with successful acquisition programs have not only increased their market share by growing at rates faster than the industry at large, but have also strengthened their positions viz a viz future market share capture.
  - Acquisitions of smaller firms with nationwide presence provide very often provide additional sales locations for the new parent.

  - Multiple acquisitions of smaller companies which provide services to the same industry or which support the same cross industry application permit a rapid nationwide presence.

  - Acquisitions of local or regional firms have not only provided an in place base for the newly acquired products/services, but also for other products already successfully marketed by the parent in other geographic locations. The inverse is also true whereby newly acquired regional or local products are eventually made available to the larger company's nationwide base.

- The investment required to fully develop new business opportunities in computer services will, in the future, be more substantial than it is today. This fact impacts the industry trend toward consolidation through acquisition and merger in a number of ways.

  - Smaller firms will increasingly become less able to compete in an industry reaching out to solve increasingly complex problems. Those firms which fall behind will gradually disappear.

  - Small and medium sized companies with reasonable current capability but which recognize the need for higher levels of investment and longer product development cycles, will begin seeking a larger partner to provide many forms of assistance, including the necessary funding.

C. IMPACT OF ACQUISITIONS ON COMPETITION

- One of the primary effects of acquisitions in the computer services industry during the last decade is the reduction in the number of strong, applications oriented regional competitors and the corresponding rise of a few nationwide delivery vehicles. One example of this can be seen by examining the market for automobile dealership services.

    - At the present time, outside of Reynolds and Reynolds, the largest nationwide services companies in this market are ADP and ITEL, both of whose dealer services operations stem from acquisitions of regional companies during the early and mid 1970s.

- The disappearance of the regional firms has resulted in the smaller and local firms to rethink their offerings and in many cases become even more specialized.

    - Whereas the small local company might consider "taking on" a regional competitor, they are less likely to enter into full fledged competition with a large national firm.

- Acquisition programs have impacted competition by providing a vehicle for larger firms to upgrade or expand their technology, thereby placing them in an improved overall competitive position.

    - This technology upgrade has come in the forms of hardware, software, and communications know-how.

    - New technology applied to tried and proven applications systems has resulted in millions of dollars of

increased profits for those firms fortunate enough to capitalize on this situation.

D. MANAGEMENT STRATEGIES

- The performance of the most successful computer services companies, measured in revenue and profit growth during the past five years, provides a good indication of how successful acquisition programs strengthen the companies that implement them.

- While the most obvious benefits of successful acquisition programs are well known and continue to be sought as key ingredients in most acquisitions, certain other benefits often accrue which are less recognized. These include:

    - Lengthening of the product life cycle. Often this effect is generated by moving into secondary and tertiary geographic markets.

    - Reduced account "cannabalism". Generally, the impact of this reduction is very beneficial because of the lessing of the involvement of already scarce marketing resources.

    - Availability of alternate delivery mechanisms. An increasing sensitivity and awareness to business needs on the part of end users is requiring a range of service solutions.

- An alternative approach to formal acquisitions is the purchase of a business base using any one of a variety of payment methods. Properly executed, this method of business expansion is effective, profitable, and considerably more easy to manage.

    - ADP has "purchased" the payroll business of several hundred banks over the years, adding many thousands of profitable accounts to the ranks of its clients. This was accomplished without the need for complicated

SED filings, accounting restatements, or fanfare.

- More and more, the management teams of large (or expecting to be large) services firms view acquisition as the lowest risk method of moving into new markets.
    - As the industry has grown, so to has the sophistication of the user. No longer is he willing to "sponsor" a new application system at his expense, providing a learning situation for the service vendor.
    - Therefore, it becomes the responsibility of the vendor to "know the business" before entering the market.
    - Obviously, buying a firm which has already paid the price of admission permits a high level of confidence in succeeding and provides a running start into the marketplace.

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C. COMPETITION

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- During this period of the past ten years, merger activitiy in the computer services industry appears to have been subject to the same periodic fluctuations that correspond to the business cycle.

    - As an example, the number of acquisitions completed by ADP in the Fiscal year marked by the 1973-1974 recession was one half the number completed in normal business years both before and after.

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    - the acquired stock is undervalued relative to its own.

    - the acquisition reduces business risk by diversification.

- The most difficult lesson learned by companies which have participated in the industry's consolidation is that mergers as such do not bring economies of scale. These economies follow when, and only when, sales forces are integrated, production is redistributed, and the products are rationalized - tasks which are not easily accomplished.

B. EFFECT ON MARKET SHARE

- Acquisitions in the computer services industry have had an impact on the market share structure in several ways. Generally, those firms with successful acquisition programs have grown more rapidly than the industry as a whole, and hence have continuously increased market share during the past ten years.

  - Examples of this are seen in Exhibit III-1 where the growth of ADP, Tymshare and Itel Data Services are shown in comparison to companies in their size categories with historically less active acquisition programs.

- Another view of how market share is impacted by acquisitions is provided by examining the changing product mix of firms with active acquisition programs.

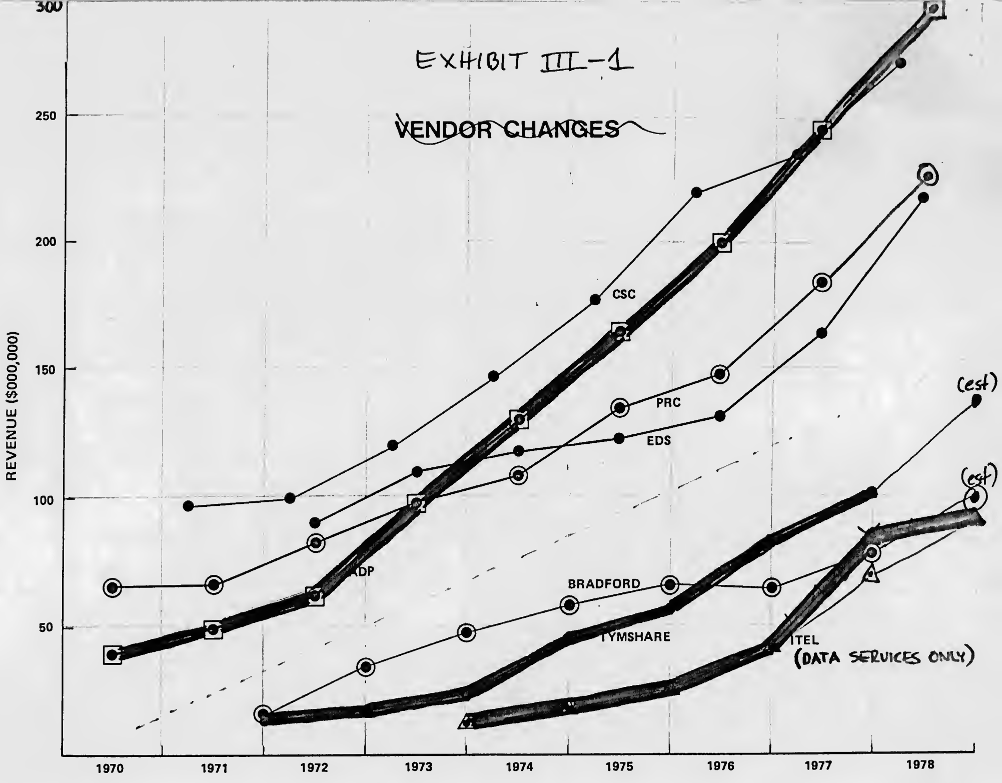
  - As shown in Exhibit III-2, Tymshare's product line revenues estimated through 1980 provide an indication of how acquired businesses double as a percentage of the total share between 1976 and 1980 (from 20% to 40%), a rate well in excess of the growth of the remainder of the industry.

- Larger computer services firms with successful acquisition programs have not only increased their market share by growing at rates faster than the industry at large, but have also strengthened their positions viz a viz future market share capture.

  - Acquisitions of smaller firms with nationwide presence provide very often provide additional sales locations for the new parent. These locations ~~provide~~ with revised staffing and training eventually ~~serve the as~~ become multi-product sales locations operating at "full speed" more quickly ~~that~~ than de novo start-ups.

EXHIBIT III-1

VENDOR CHANGES



INPUT

EXHIBIT III -2

IMPACT OF ACQUISITIONS ON MARKET SHARE

~~VENDOR CHANGES~~

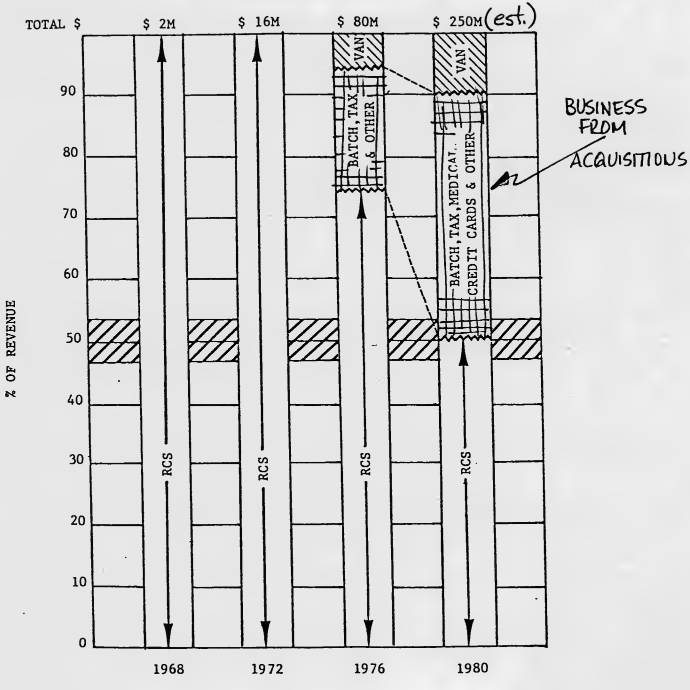
~~TYMSHARE~~

VIEWED FROM

DISTRIBUTION OF REVENUES

BY PRODUCT LINES

(TYMSHARE)



  - Multiple acquisitions of smaller companies which provide services to the same industry or which support the same cross industry application permit the establishment of a rapid nationwide presence.

  - Acquisitions of local or regional firms have not only provided an in-place base for the newly acquired products/services, but also for other products already successfully marketed by the parent in other geographic locations. The inverse is also true whereby newly acquired regional or local products are eventually made available to the larger company's nationwide base.

- The investment required to fully develop new business opportunities in computer services will, in the future, be more substantial than it is today. This fact impacts the industry trend toward consolidation through acquisition and merger in a number of ways.

  - Smaller firms will increasingly become less able to compete in an industry reaching out to solve increasingly complex problems. Those firms which fall behind will gradually disappear.

  - Small and medium sized companies with reasonable current capability but which recognize the need for higher levels of investment and longer product development cycles, will begin seeking a larger partner to provide many forms of assistance, including the necessary funding.

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- One of the primary effects of acquisitions in the computer services industry during the last decade is the reduction in the number of strong, applications oriented regional competitors and the corresponding rise of a few nationwide delivery vehicles. One example of this can be seen by examining the market for automobile dealership services.
    - At the present time, outside of Reynolds and Reynolds, the largest nationwide services companies in this market are ADP and ITEL, both of whose dealer services operations stem from acquisitions of regional companies during the early and mid 1970s.
- The disappearance of the regional firms has resulted in the smaller and local firms having to rethink their offerings and in many cases to become even more specialized.
    - Whereas the small local company might consider "taking on" a regional competitor, they are less likely to enter into full fledged competition with a large national firm.
- Acquisition programs have impacted competition by providing a vehicle for larger firms to upgrade or expand their technology, thereby placing them in an improved overall competitive position.
    - This technology upgrade has come in the forms of hardware, software, and communications know-how.
    - New technology applied to tried and proven applications systems has resulted in millions of dollars of

increased profits for those firms fortunate enough to capitalize on this situation.

D. MANAGEMENT STRATEGIES

- The performance of the most successful computer services companies, measured in revenue and profit growth during the past five years, provides a good indication of how successful acquisition programs strengthen the companies that implement them.
- While the most obvious benefits of successful acquistion programs are well known and continue to be sought as key ingredients in most acquisitions, certain other benefits often accrue which are less recognized. These include:
    - Lengthening of the product life cycle. Often this effect is generated by moving into secondary and tertiary geographic markets.

- Reduced account "cannabalism".

  Generally, the impact of this reduction is ~~much more~~ very beneficial ~~than~~ because of the lessing of the involvement of already scarce marketing resources.

- Availability of alternate delivery mechanisms.

  An increasing sensitivity and awareness ~~of~~ to business needs on the part of end users is requiring a range of service solutions.

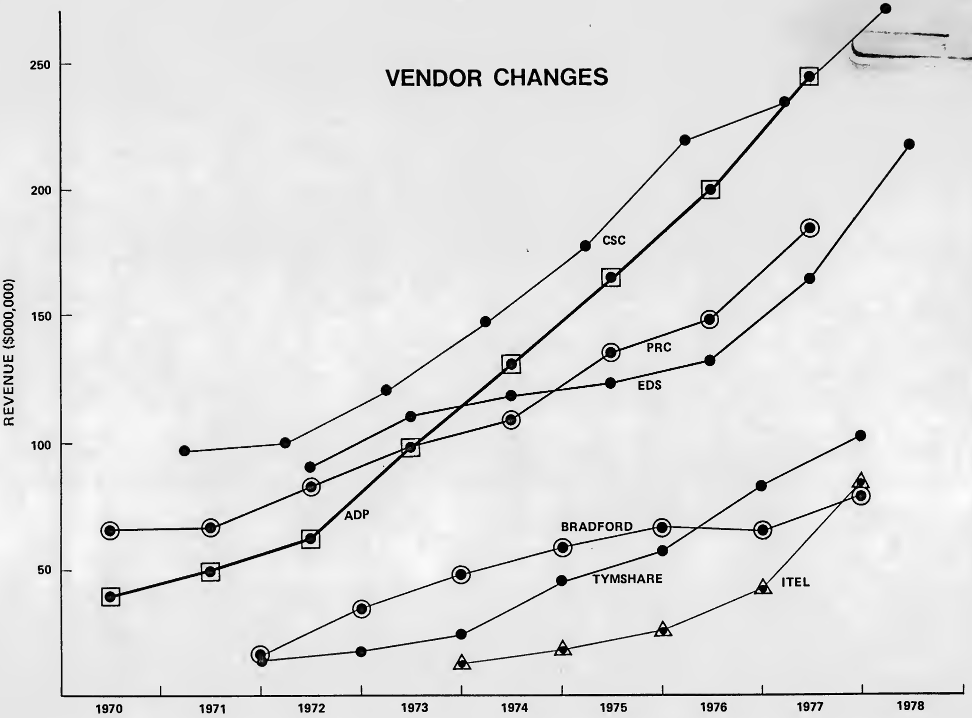
- An alternative approach to ~~as~~ formal acquisitions is the purchase of a business base using any one of a variety of ~~pay out~~ payment methods. Properly executed, this method of business expansion is effective, profitable, and considerably ~~eas~~ more easy to manage.

    - ADP has "purchased" the payroll business of several hundred banks over the years, adding many thousands of profitable accounts to the ranks of its clients. This was accomplished without the need for complicated SEC filings, accounting restatements, or fanfare.

- More and more the management ~~groups~~ teams of large (or expecting to be large) services firms view acquisition as the lowest risk method of moving into new markets.

– As the industry has grown, so to has the sophistication of the user. No longer is he willing to "sponser" a new application system at his expense, providing a learning situation for the service vendor. Therefore, it becomes the responsibility of the vendor to "know the business" before entering the market.

– Obviously, buying a firm which has already paid the price of admission permits a high level of confidence in succeeding, and provides a ~~quick start~~ running start. into the marketplace.


VENDOR CHANGES
REVENUE ($000,000)
250
200
150
100
50
1970
1971
1972
1973
1974
1975
1976
1977
1978
CSC
ADP
PRC
EDS
BRADFORD
TYMSHARE
ITEL

ACQUISITIONS
EFFECT ON MARKET SHARE

- HAVE PERMITED RAPID NATIONWIDE PRESENCE ⇐
- HAVE PERMITED RAPID BROADENING OF PRODUCT LINE TO VERTICAL INDUSTRY
- PERMITTED ALTERNATE DELIVERY MECHANISMS

ACQUISITIONS IMPACT COMPETITION

- REDUCED THE NUMBER OF REGIONAL COMPETITORS
  example: AUTOMOBILE DEALERSHIP SERVICES
- CAUSED SMALLER FIRMS TO RETHINK THEIR OFFERINGS AND BECOME MORE SPECIALIZED

  ↳ whereas they might consider "taking on" a regional competitor, they are less likely to want to compete with a large national firm
- PERMITS LARGER FIRMS TO UPGRADE THEIR TECHNOLOGY

  e.g. ADP ⟶ CYPHERNETICS
- GENERALLY REDUCED ACCOUNT "CANNABALISM"

OTHER
- LENGTHEN THE PRODUCT CYCLE

Future

> Accelerating Acquisitions

Small institutions can't fund
technology
marketing

① No money,

> Small specialized regional processor
doesn't have a place

Ⓑ Market Share
CSC
TYMSHARE
ADP

Ⓒ Competition

- Strengthens companies that make good ACQ
  - allows them to grow more rap

pg. 103 - Everyone of companies excep

- lower risk way of moving into new markets

- Price of stock
  Relatively inexpensive depending on stock
  ½ were for stock, ½ for cash
- Full payment at front end.

INPUT

PARK 80 PLAZA WEST-I • SADDLE BROOK, NEW JERSEY 07662 • (201) 368-9471

October 24, 1978

Mr. John Crawford
Vice President
Mohawk Data Sciences
1599 Littleton Road
Parsippany, NJ 07054

Dear John:

Per your request, attached are the names of more than 50 leading computer services companies, main contact points, and revenue levels as appropriate.

They are categorized into three groups:

- Multi Service Companies - 28 companies
- Network Companies - 13 companies
- Specialized Services - 15 companies

You should be aware that the revenues shown are for each company's 1978 fiscal year. Accordingly, some are estimated for the fiscal year end.

Should you need additional information, please do not hesitate calling. About 80% of the companies included in the attached lists are described in our CAMP highlights (see attached example for QUOTRON SYSTEMS) about which we've already spoken. Again, I would encourage MDS to subscribe to the program as part of your active pursuit of the computer services industry.

Very truly yours,

Edward I. Metz
Principal

EIM/gac
Enclosures

cc: Mr. Pete Anderson

NETWORK COMPANIES	FY 1978 COMPUTER SERVICES REVENUE ($ mil) TOTAL	RCS	OTHER
COMPUSERVE Jeff Wilkins, President Columbus, OH	$18	$18	-
COMSHARE Richard Crandall, President Ann Arbor, MI	$24	$24	-
COMPUTER NETWORK (COMNET) Lee Johnson, President Bill Brehm, Exec. V.P. Washington, D.C.	$17	$17	-
DATALINE SYSTEMS Joe Paradi, President Toronto, Ontario	$9	$9	-
GENERAL ELECTRIC INFORMATION SERVICES Donald Bates, General Mgr. Rockville, MD	$160	$160	-
INTERACTIVE DATA CORP. (IDC) John McElroy, President Waltham, MA	$14	$14	-
I.P. SHARP Ian Sharp, President Toronto, Ontario	$15	$15	-
NATIONAL CSS Bob Weissman, President Wilton, CT	$50	$50	-
ON-LINE SYSTEMS John Godfrey, President Pittsburgh, PA	$22	$22	-
RAPIDATA Bob O'Brien, President Fairfield, NJ	$20	$20	-
REMOTE COMPUTING CORP. Charles Calderraro, President Palo Alto, CA	$8	$8	-

- NETWORK COMPANIES

	FY 1978 COMPUTER SERVICES REVENUE ($ mil)		
	TOTAL	RCS	OTHER
SCIENTIFIC TIME SHARING Dan Dyer, President Bethesda, MD	$10	$10	-
UNITED COMPUTING SYSTEMS Jack Lorenz, President Kansas City, MO	$45	$40	$5

• SPECIALIZED SERVICE COMPANIES	COMPUTER SERVICES FY 1978 REVENUE ($ mil)
BOWNE TIME SHARING Dale Ries, President NYC, NY	$8
DRI (DATA RESOURCES) Otto Eckstein, President Lexington, MA	$32
EDS Ross Perot, Chairman Dallas, TX	$200
FINANCIAL INDUSTRY SYSTEMS James Rowe, President Hartford, CT	$20
HEALTH APPLICATION SYSTEMS Robert Abrams, President Burlington, CA	$40
INSCO SYSTEMS CORP. Paul Cassidy, Vice President Neptune, NJ	$35
KEYDATA Ed Donegan, President Wellesley, MA	$15
MANUFACTURING DATA SYSTEMS Ken Stephanz, President Ann Arbor, MI	$27
NATIONAL DATA CORP. L. C. Whitney, President Atlanta, GA	$39
QUOTRON Milt Mohr, President Los Angeles, CA	$32
REYNOLDS & REYNOLDS Ed Strasser, President Dayton, OH	$60
SHARED MEDICAL James Macaleer, President King of Prussia, PA	$65

• SPECIALIZED SERVICE COMPANIES	COMPUTER SERVICES FY 1978 REVENUE ($ mil)
STRUCTURAL DYNAMICS RESEARCH Jason Lemon, President Cincinnati, OH	UNK
WESTERN UNION DATA SYSTEMS Tom Medley, Pres. - NATIONAL SHAREDATA Ernest Hilman, V.P. - WUIS Upper Saddle River, NJ	$40
XEROX COMPUTER SERVICES Haig Bazoian, President Los Angeles, CA	$30

• MULTI SERVICE COMPANIES	FY 1978 COMPUTER SERVICES REVENUE ($ mil)			
	TOTAL	RCS	BATCH	OTHER
AMERICAN MANAGEMENT SYSTEMS Charles Rossotti, President Arlington, VA	$24	$4	$4	$16
ANACOMP INC. Ron Palamara, President & Chairman Indianapolis, IN	23	5	6	12
AUTOMATIC DATA PROCESSING Josh Weston, President Clifton, NJ	300	60	200	40
BOEING COMPUTER SERVICES R. W. Tharrington, President Dick Henderson, Vice President Morristown, NJ	85	35	25	25
BRADFORD NATIONAL CORP. Peter Del Col, President NYC, NY	120	10	90	20
CANADA SYSTEMS GROUP Ross Hutchinson, Vice Pres. Mississauga, Ontario	25	-	22	3
COMPUTEL SYSTEMS, LTD Gordon Gow, Vice President Ottowa, Ontario	22	-	18	4
THE COMPUTER COMPANY Walter Witschey, President Richmond, VA	10	2	6	2
COMPUTER CONSULTING SERVICE Jim Houtz, President Dubuque, IA	10	9	1	0
COMPUTER USAGE Vic Bartoletti, President San Francisco, CA	10	-	5	5
COMPUTER SCIENCES CORPORATION Bill Hoover, Chairman El Segundo, CA	280	75	5	200

- MULTI SERVICE COMPANIES

	FY 1978 COMPUTER SERVICES REVENUE ($ mil)			
	TOTAL	RCS	BATCH	OTHER
CONTROL DATA CORPORATION H. J. (Hank) White, Exec. V.P. Minneapolis, MN	$400	$165	UNK	UNK
DATA CROWN, LTD David Carlisle, V.P. Don Mills, Ontario	22	20	2	-
DATATEL, INC. Earl Kendrick, President Alexandria, VA	9	-	9	-
INFORMATICS, INC. Walter Bauer, President Woodland Hills, CA	90	-	25	65
ITEL (DATA SERVICES) Les Kerper, Vice President Greenwich, CT	90	30	60	-
KAMAN SCIENCES CORP. Dr. Al Bridges, President Colorado Springs, CO	18	-	14	4
MARTIN MARIETTA DATA SYSTEMS Barry Rowe, President Baltimore, MD	50	20	-	30
MCDONNELL DOUGLAS AUTOMATION W. R. Orthwein, President St. Louis, MO	250	90	160	-
MULTIPLE ACCESS LTD. John McCutcheon, President Don Mills, Ontario	25	15	8	2
NLT COMPUTER SERVICES D. C. Altenbern, President Nashville, TN	20	2	14	4
OPTIMUM SYSTEMS William Roach, President Santa Clara, CA	40	-	25	15
PENTAMATION ENTERPRISES Jeff Feather, President Bethlehem, PA	9	5	1	3

- MULTI SERVICE COMPANIES

	FY 1978 COMPUTER SERVICES REVENUE ($ mil)			
	TOTAL	RCS	BATCH	OTHER
PLANNING RESEARCH CORP. Jack Little, President Washington, D.C.	$225	-	$65	$160
SUN INFORMATION SERVICES John Ryan, President Wayne, PA	45	30	2	13
SYSTEMS DIMENSIONS Ottowa, Ontario	20	-	20	-
TYMSHARE, INC. Tom O'Rourke, Pres. & Chmn. Cupertino, CA	101	75	10	16
UNIVERSITY COMPUTING CORP. John Kason, President Dallas, TX	65	-	50	15

NIS Revenue

	'73	'78	Δ
GEIS	85 M	185	100
CDC	79 M		
GTE IS	36M		
BR	35M		
WYLY	29M		
NCSS	24		
TYM	24		
CSC	24		
NCR	17		
Mc Auto	16		
BCS	14		
UCS	12		
ADP	11		
IDC	10		
Key	10		
OLS	9		
Comshare	9		
Rap	9		
Quotron	9		

DRAFT

MEMORANDUM

July 2, 1976

TO : Bruce Anderson

FROM: David Hathaway

SUB : Corporate Development Plan Fiscal 1977

Introduction

The primary focus of the Fiscal 1977 Corporate Development plan will be to provide avenues of additional growth for ADP. This will be accomplished through an acquisition program that is coordinated with the overall product development and expansion plans of the various ADP Divisions. It is the intent of Corporate Development in the new fiscal year to initiate and consumate acquisitions which will provide the foundation for ADP's growth over the next 3-5 years. To function effectively in this capacity, Corporate Development must be a "clearing house" for ADP's multifarious development efforts and thereby increase the level of coordination between the corporate development and product development processees.

A key vehicle for accomplishing this will be the implementation of a more formalized market research and competitive analysis program than has heretofore existed. The essential role of this function will be to serve as a filter for identifying, screening, and evaluating potential acquisitions candidates. It will also establish a medium for ongoing dialogues with the various ADP divisions.

General Guidelines

In formulating our specific plan objectives, the following considerations have been taken into account:

(1) ADP enters fiscal 1977 with considerable revenue and profit momentum, affording the opportunity to acquire companies which broaden our product offerings in the expectation that these investments will provide significant long term growth potential.

(2) Given our existing base of business in Europe, further expansion in the international marketplace is desirable.

(3) Geographic expansion in the US, while largely completed for the Commercial Services Division, still offers some attractive opportunities in certain metropolitan areas and in certain product/service areas.

(4) Acquisitions should capitalize on the broad range of technical and "delivery" capabilities which ADP offers.

(5) In view of industry and technological trends, and to improve further our overall economies of scale in certian business segments, business combinations which add to an established "nucleus" of recently acquired operations, such as Cyphernetics/TSL and FCS, should be considered.

Each of these considerations should be weighed in the context of formulating a longer term strategy that, combined with internal growth, will bring ADP to the $500 Million annual billings level within 5-6 years.

Scope of Acquisition Efforts

ADP's long term growth objectives place a high priority on identifying and pursuing significant new market segments, whether they be geographic or

functional in nature. In general terms, we will pursue acquisitions which fit within existing ADP divisions and thereby secure additional market penetration and product capability. Our consideration of acquisition candidates which represent an extension of our existing offerings or are ancillary in nature will necessitate the company having already established a "critical mass", on going momentum, and a product or service that lends itself to ADP's existing mode of operations.

The following general areas are listed in descending priority (although obviously circumstances or a reevaluation may result in a reordering of the prioritites), with specific candidates listed in Appendix A.

(1) Additional Industry Penetration - this is especially needed in the banking/thrift/credit union areas through both geographic and functional expansion. Although FCS has provided us with an initial entree, the addition of IBM processing capability plus geographic expansion resulting from acquiring regional companies similar to FCS is desirable. Above all, some measure of coordination with the ~~INTERNAL~~ internal EFTS effort is required. The penetration of the banking market, however, should only be launched after a thorough examination of the longer term market potential, including profit opportunities.

(2) International Expansion - Increasing our European business base (both batch and on-line) is imperative as we broaden our corporate marketing focus to include larger companies, many of which are multinational in nature. The addition of a larger business base in Europe also offers potential organizational benefits from a tax and profitability standpoint.

(3) Ancillary Product Areas - Consideration is being given to creating a "personnel services division" as an offshoot to our basic payroll

business which would market related services in the areas of employee benefit reporting, unemployment compensation, pension fund and profit sharing accounting, and the like. Also, the addition of a professional systems programming effort to assist ADP internally as well as providing its services to outside customers is being evaluated.

(4) Domestic Geographic Expansion - Five US cities (Charlotte, Portland/Seattle, New Orleans, San Antonio and Jacksonville) have been identified by the Commercial Services Division as possible expansion cities in fiscal 1977.

(5) Network Expansion - Three avenues of expansion are open to us (IBM processing capability, specialized product capability, and additional network capacity). We are actively considering the first two, but industry conditions and consolidations may present opportunities in the third area as well.

(6) Other Specialized Industry Efforts - The insurance industry remains an attractive candidate, as does the medical, retail and manufacturing sectors.

(7) Manufacturing Liaision - In view of our growing commitment to mini-computer based systems as an end product, a closer affiliation (yet to be defined) with a manufacturer of small systems may become advisable at some point in the future.

Market Research/Competitive Analysis

During fiscal 1977 a formalized market research and competitive analysis effort will be established within Corporate Development. The program will

consist of both an analysis of specific market opportunities for ADP as well as providing a means for monitoring our competition in major product/market areas. The primary purpose of this activity will be to identify and screen new growth opportunities. It will offer the residual benefits of providing a useful tool for evaluating our position in certain markets relative to our competition. As such, it should provide helpful inputs for marketing and advertising.

For this program to be successful, it requires feedback and a dialogue between headquarters and the various divisions. If this is accomplished it will facilitate Corporate Development~~'s~~ is functioning as a "clearing house" for coordinating/monitoring the overall ADP development effort.

The program will be divided into three parts:

(1) Specific Industry/Market Studies: Approximately quarterly a detailed analysis will be prepared which explores a specific market opportunity and concludes with specific set of recommendations for ADP to implement. In addition to providing a market ~~or~~ over~~r~~eview, the study will discuss the competitive environment and analyze financial p~~e~~ar~~i~~ameters ? and profit opportunities. At present, a study on the Banking Industry is nearing completion which should serve as a framework for our acquisitions/product expansion plans in that industry segment. Other subjects under consideration for similar analysis are: insurance processing, on-line accounting applications (as an extension of NPL), health care, and other financial services.

(2) Industry Trends: This would represent a quarterly synthesis of the major trends in the data services industry as derived from our analysis and monitoring of major competitors. It will be an outgrowth of our competitive analysis effort and will be developed from published financial and product information. The purpose will be to provide a measure of the current industry and competitive environment. With the help of the ADP field force in terms of providing inputs, an~~d~~ accurate and timely perspective of the competitive situation can be maintained. At the outset, distribution would be to divisional presidents, with broader circulation possible after the program is further refined. The initial Computer Services Summary will be prepared for distribution at the end of our first fiscal quarter. Included will be summary comments on recent performance and developments pertaining to our major competitors based on available public information.

(3) Data Collection & Analysis: An outgrowth of the above will be the establishment of a comprehensive data bank, maintaining archival information on a broad cross section of computer services and hardware firms. This will entail both the preparation of an annual review based on the company's annual report and its 10-K and the maintenance of an up-to-date data base on each company. It is our intention to eventually maintain the data base on the Cyphernetics network and thereby automate certain of the required calculations. The summary reports on each company will include a standard set of financial ratios, enabling some cross analysis to be made. Examples would be revenues per employee, revenues per customer, revenues per product

area, new product increment, cost structure and profitability analysis, return on equity, cash flow and financing requirements.

I

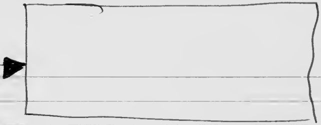
24 million - TYM

'72-'73 - CSC ~~[illegible]~~ RCS 80 info

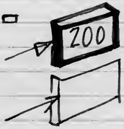
- NCSS

80 ZYTRON

135



- MAKE a few big companies happen



A

STABALIZE the industry

> Less of cottage industry

Big companies standardize

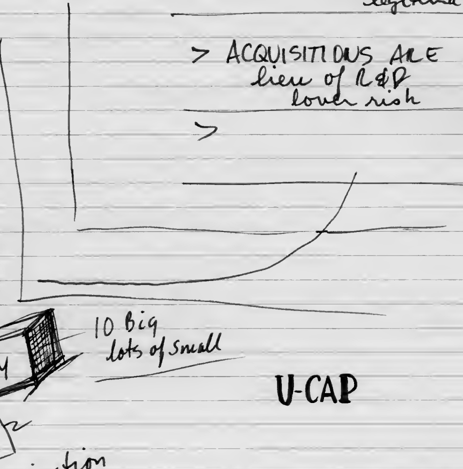
> more R&D legitimate

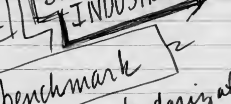
NET # being driven

> ACQUISITIONS ARE in lieu of R&D lower risk

>

1 million





10 Big lots of small

like

benchmark

little standarization in pricing offering

U-CAP

ELY'S HOTEL

INDUSTRY ANALYSIS

Impact on Industry

- Reduction in company
-
-

Industry overall

IMPACT OF ACQUISITION

- healthier
- effectiveness

IMPACT

Counts & companies

Less than	2
Greater	2 – 5
	5 – 10
	10+

MAJOR PURPOSES OF CORPORATE DEVELOPMENT PROGRAMS

- TO PROVIDE AVENUES OF ADDITIONAL GROWTH
  - ACQUISITION PROGRAM
  -
- TO BROADEN PRODUCT OFFERINGS
  - THESE INVESTMENT SHOULD PROVIDE LONG TERM POTENTIAL
- GEOGRAPHIC EXPANSION
  - DOMESTIC
  - OVERSEAS
- INDUSTRY PENETRATION
  - geographic
  - functional
- NETWORK EXPANSION
- ENTRY INTO NEW INDUSTRY SECTORS

WHO HAS DONE THEM

- **ADP** ≈55
- **ITEL** ----------
- BCS – IN & OUT
- CDC / SBC

March 23, 1979

Mr.

Dear Mr. :

You were kind enough to participate recently in our research project on Performance Improvement: User Techniques And Experiences.

This study has how been completed and it is a pleasure to send you some of the key results with this note.

Thank you for your assistance and please don't hesitate to call me at (201) 368-9471 if you have any questions.

Yours sincerely,

George Heidenrich
Senior Consultant

GH/drc
Attachment – Executive Summary

U-CAP Thank you letter.

SEND U-CAP INTERVIEWEE SUMMARIES

1. John Nack
Standards & Controls Manager
Caterpiller Tractor
600 W. Washington
Peoria IL 61629

2. David Barth
Manager of Technical Support
Salomon Brothers
One New York Plaza
New York NY 10004

3. Philip Hess
Director of Corporate Data Processing
Warner Lambert
201 Tabor Road
Morris Plains NJ 07950

4. Joseph Rocco
Director, office of Data Processing
NYC Dept. of Social Services
2 Broadway, Sixth Floor
New York NY 10004

5. Edward Molinelli
Controller
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40 W. 57th St.
New York NY 10020

6. Walter Hagerty
Administrative Asst.
House Information Systems
HOBA #2
Washington DC 20515

7. Gerald H. Sandler
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Grumman Aerospace Corp.
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Bethpage NY 11714

8. William Moyer
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AMP Inc.
449 Eisenhower Blvd
Harrisburg PA 17105

X 9. Arthur Carroll
Petroleum Data Corp
1101 State Road
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10. Michael J. Parisi
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11. John R. McClernan
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Cherry Hill NJ 08101

12. John Crooks
Vice President
Wells Fargo Bank
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525 Market St
San Francisco CA 94105

13. George Kershaw
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Division of Management Systems
and Financial Statistics
550 17th St NW
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14. Bennett Meyer
Unit Head
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Support Equipment Engineering
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Little Falls NJ 07424

x 15. John Houseman
Sr Vice President
Irving Trust Co.
40 Rector Street, 10th Floor
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16. Ms. Nancy Bern
Assistant Director, EDP Education
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Boston MA 02117

17. John Penniston
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18. Robert Benjamin
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Rochester NY 14644

19. Bill Stieger
Standard Oil of Ohio
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101 Prospect Avenue
Cleveland OH 44115

X 20. Jerry Meach
~~Ford Aerospace~~ FMCC
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Dearborn, MI 48121

21. ~~John Eldredge / Jim Church~~
~~Boeing~~

X 22. Tony Constable
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Gaithersburg MD 20760

23. Mr. Sal Asad - Sent 4/23/79
Mgr. Systems Performance
RCA Corp.
Route 38 at Haddonfield Rd.
Cherry Hill, NJ 08034